CITY OF ELYRIA, OHIO
Department of Health
Division of Pollution Control



# APPLICATION FOR PERMIT

This application for permit must be returned within 30 days after receipt to: City Chemist, Department of Health, 266 Washington Ave., Elyria, Ohio 44035

The undersigned hereby applies for a permit to discharge industrial wastes into the sewerage system of the City of Elyria. The undersigned represents as true the following information to be used in evaluation of this application:

Company or Corporation Kewanee Oil Company, Harshaw Chemical Division

Address 113 John Street Elyria, Ohio 44035

Telephone 322-3741 Date September 20, 1973

Name and Title of Company Executive submitting this form:

C. E. Hoskin, Plant Manager

Type of Manufacturer (machine shop, garage, etc.)

Chemical Plant

Products manufactured on premises Catalysts, Pigments, Glass and Ceramic Colors

Materials used in production Variety of Chemicals

List petroleum products, how they are used, and the amount of each product used. (include all soluble oils, emulsified oils, cutting oils, lubricating oils, and coolants)

Cutting oil

Lubricating oil

Description of processes or operations causing the industrial wastes. (Attach statement if more space is required.)

Fume scrubbing solutions, cooling waters, steam condensate, filtrates, leach waters, cleanup waters

Please list specific chemicals and raw materials used and the quantities used, as listed below:

## I. ORGANICS

A. Petroleum Products (oils, greases, tars, etc.)

B. Synthetics (polymers, immiscible solutions, nitriles, cyanides, phenols, ethers, plastics, etc.)

Sterotex

C. Detergents (phosphate products, alkali products, sulfate products, etc.)

Trisodium phosphate

D. Volatile or flammable substances (explosives, solvents, gasoline, etc.)

Varnolene | Synasol (denatured alcohol)
methyl isobutyl Ketone
ethyl acetate
aviation gasoline

## II. INORGANICS

A. Acids (sulfuric, hydrochloric, nitric, etc.)

Sulfuric acid | Hydrochloric acid | Hydrofluric acid
Nitric acid | Chromic acid | Acetic acid

B. Bases (sodium hydroxide, caustic sodas, lyes, etc.)

Sodium hydroxide | Ammonium hydroxide
Soda ash

C. Salts (sodium chloride, cyanide salts, mercury salts, etc.)

Sodium chloride | Ammonium chloride | Calcium chloride
Sodium sulfide | Ammonium sulfate | Barium sulfide
Sodium silicate

D. Metallic ions (copper, iron, chromium, radioactives, etc.)

Nickel nitrate | Cobalt nitrate | Copper chloride
Copper nitrate | Ferric chloride | Lead nitrate
Copper carbonate | Zirconium carbonate | Ammonium molybdate
Aluminum nitrate | | Ammonium tungstate

E. Other

Cadium metal | Bismuth metal | Tin metal | Zinc meta
Selenium metal | Graphite

SECTION I. Water Intake by Source

| SOURCE | ESTIMATED AVERAGE DAILY FLOW (gals) |
|---|---|
| 1. Municipal Water Supply | 600,000 Gal./day |
| 2. Private Water Supply | None |
| 3. Other (specify) | None |

SECTION II. Water Use

| PURPOSE OF WATER USE | ESTIMATED AVERAGE DAILY FLOW (gals) |
|---|---|
| 1. Process | 396,000 Gal./day |
| 2. Cooling | 45,000 Gal./day |
| 3. Fume Scrubbing Water | 65,000 Gal./day |
| 4. Boiler Feed-Water | 77,000 Gal./day |
| 5. Sanitary Use | 7,000 Gal./day |
| 6. Other (specify) Cleanup equipment, floors, etc. | 10,000 Gal./day |

SECTION III. Treatment of Intake Water by Purpose

| TREATMENT (type) | ESTIMATED AVERAGE DAILY FLOW (gals) |
|---|---|
| 1. Deionization | 58,000 Gal./day |
| 2. Softening | 77,000 Gal./day |
| 3. | |
| 4. | |

SECTION IV. TYPE OF INDUSTRIAL WASTE WATER PRODUCED

| | EST. AVERAGE DAILY FLOW (Gals) |
|---|---|
| 1. Fume scrubbing | 65,000 Gal./day |
| 2. Processing | 383,000 Gal./day |
| 3. Cooling | 45,000 Gal./day |
| 4. Equipment and Floor Cleanup | 10,000 Gal./day |
| 5. Steam condensate | 66,000 Gal./day |

SECTION V. Treatment, if any, Given to Waste Waters

| TYPE OF TREATMENT | ESTIMATED AVERAGE DAILY FLOW (gals) |
|---|---|
| 1. Neutralization | 18,000 Gal./day |
| 2. Copper & Chromium removal | 2,000 Gal./day |
| 3. Solids removal (filtration) | 54,000 Gal./day |
| 4. Solids removal (settling ponds) 3. | 51,000 Gal./day |

SECTION VI. POINT OR POINTS OF DISCHARGE OF WASTE WATERS

| POINT OF DISCHARGE | ESTIMATED AVERAGE DAILY (gals) |
|---|---|
| 1. Fresh Water body | None |
| 2. Sanitary Sewer | 395,000 Gal./day |
| 3. Storm Sewer | |
| 4. Other Combination sewer | 174,000 Gal./day |

SECTION VII. LOCATION OF DISCHARGE POINTS TO SANITARY AND/OR STORM SEWER

1. Various manholes - accessible
2. Various underground connections - not accessible
3.
4.

SECTION VIII. METHOD OF DISPOSAL OF SOLID WASTES AND HAULER'S NAME

1. Compactor - Brotherton Disposal, Inc.
2. Sludges - Chemlime Corp.
3.

SECTION IX. PHYSICAL DESCRIPTION OF WASTEWATER DISCHARGE

| PARAMETER | Concentration mg/L (PPM) | lbs/Day | Daily Volume (gals) |
|---|---|---|---|
| 1. Color | | | |
| 2. pH | 6.6 | | |
| 3. Temperature (Summer) | | | |
| 4. Temperature (Winter) | | | |
| 5. Alkalinity as $CaCO_3$ | | | |
| 6. B.O.D. (5 day) | 33 | 156 | |
| 7. C.O.D. | 87 | 412 | |
| 8. Total Solids | 1696 | 8039 | |
| 9. Suspended Solids | 269 | 1275 | |
| 10. Dissolved Solids | 1427 | 6764 | |

| PARAMETER | Concentration mg/L (PPM) | lbs/Day | Daily Volume (gals) |
|---|---|---|---|
| 11. D.O. | | | |
| 12. T.O.C. (Total Org. Carbon) | | | |
| 13. Radioactivity | | | |
| 14. Turbidity | | | |
| 15. Hardness | | | |
| 16. Nitrates as N | | | |
| 17. Total Phosphorus | | | |
| 18. Sulfates | | | |
| 19. Sulfites | | | |
| 20. Chlorides | | | |
| 21. Cyanide | | | |
| 22. Fluoride | | | |
| 23. Aluminum | | | |
| 24. Antimony | | | |
| 25. Arsenic | | | |
| 26. Beryllium | | | |
| 27. Barium | 2.3 | 11 | |
| 28. Boron | | | |
| 29. Cadmium | 0.5 | 2 | |
| 30. Calcium | | | |
| 31. Cobalt | 0.2 | 1 | |
| 32. Chromium (total) | 9.0 | 43 | |
| 33. Copper | 17.8 | 84 | |
| 34. Iron | | | |
| 35. Lead | 10.4 | 49 | |
| 36. Magnesium | | | |

| PARAMETER | Concentration mg/L (PPM) | lbs/Day | Daily Volume (gals) |
|---|---|---|---|
| 37. Manganese | | | |
| 38. Mercury | 0.0015 | 0.007 | |
| 39. Molybdenum | 0.2 | 1 | |
| 40. Nickel | 0.6 | 3 | |
| 41. Selenium | <1 | <5 | |
| 42. Silver | | | |
| 43. Potassium | | | |
| 44. Sodium | | | |
| 45. Titanium | | | |
| 46. Tin | | | |
| 47. Zinc | 1.5 | 7 | |
| 48. Oil-Grease | | | |
| 49. Phenols | | | |
| 50. Surfactants | | | |
| 51. Chlorinated Hydrocarbons (except pesticides) | | | |
| 52. Pesticides | | | |
| 53. Total Coliform/100 ml | | | |
| 54. Fecal Coliform/100 ml | | | |
| 55. Fecal Streptococci/100 ml | | | |
| 56. Other | | | |
| 57. Other | | | |

SECTION X. INDICATE LOCATION OF SUITABLE SAMPLING MANHOLE FOR ALL OF YOUR SANITARY AND STORM SEWER DISCHARGE POINTS.

Sanitary - Concrete Head Tower - across river from Mound St. pumping station

Combination - Manhole corner Locust and John Streets

**The undersigned authorizes representatives of the City of Elyria to inspect the above premises during business hours without prior appointment at any time while this application is still pending or while the requested permit is in force and shall make available a suitable control manhole, located accessibly and safely, to facilitate observation, sampling, and measurement of the wastes.**

In consideration of the granting of this permit, the undersigned agrees:

1. To furnish a certified chemical analysis and a sample of the wastes to be or being discharged now and upon future request.

2. To accept and abide by all provisions of Ordinance No. 73-18 of the City of Elyria and all state laws.

3. To operate and maintain any waste pre-treatment facilities as may be required as a condition of the acceptance into the sewerage system of the industrial wastes involved, in an efficient manner at all times and at no expense to the City of Elyria.

4. To notify the Safety-Service Director and the Sewage Treatment Plant Superintendent immediately in the event any unusual discharge of such volume, or containing such materials, as not to be expected in normal operations as described in this permit.

5. To notify the Safety-Service Director and the Sewage Treatment Plant Superintendent of changes of processes and/or changes in sewerage connections and/or changes in chemicals, etc., used in processes and to incorporate treatment of industrial waste resulting from changes in, or expansion of any new or revised process which would result in exceeding the limits that govern sewer discharges. Such changes will require an amendment of this permit.

It is understood no fee is to be charged for this permit.

Date September 20, 1973

Kewanee Oil Company - Harshaw Chemical Company Division
(Applicant)

By C. E. Johnson

Title Plant Manager

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

Confidential Information Removed —

INORGANIC CHEMICALS CATEGORY

Part II - WATER USE, RE-USE, AND DISCHARGE

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U. S. EPA (WH-552)
Washington, D. C. 20460

1. Water Use and Disposition: Total Plant Needs During The Period January 1, 1975 to June 30, 1976

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of wastewaters. If a time period of less than January 1, 1975 to June 30, 1976 is used, state the reason for the shorter period or state that the values used are representative of that period. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product). Where values are not known for individual products, groupings of products may be used which give the greatest amount of detail available.

Product(s) Total plant usage - Jan. thru June, 1973

Process(s) (This is only data presently available - should be representative)

A. Water Source:

| | Time Period of Calculation |
|---|---|
| Municipal ---------- MGD (average value) | 0.60 |
| Surface ---------- MGD | -0- |
| Ground ---------- MGD | -0- |
| Other (specify)------ MGD | -0- |

B. Uses:

| | |
|---|---|
| Non-contact cooling ---------- MGD | 0.045 |
| Direct process contact (as diluent, solvent, carrier, reactant, by-product, cooling, etc.) ---------- MGD | 0.396 |
| Indirect process contact (pumps, seals, leaks, spills, etc.) ---------- MGD | |
| Maintenance, equipment cleaning and work area washdown ---------- MGD | 0.010 |

The Harshaw Chemical Company
Elyria Plant
Elyria, Ohio

Part II

Question 1

The stannic oxide process uses approximately five gallons per minute of non-contact cooling water, obtained from the municipal water supply, as a pump bearing coolant (molten tin metal pump).

During the time period stated this water was discharged to the City of Elyria's combination sewer system.

Balance of date for this question details the overall plant water usage per survey taken in August 1973. More recent data is not available, or has not yet been surveyed.

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

| | | Time Period of Calculation |
|---|---|---|
| Air Pollution Control | MGD | 0.065 |
| Non-contact ancillary uses (boilers, utilities, etc.) | MGD | 0.077 |
| Sanitary and potable water | MGD | 0.007 |
| Other (specify) | MGD | -0- |

C. Source of Wastewater Flows:

| | | |
|---|---|---|
| Non-contact cooling | MGD | .045 |
| Direct process contact | MGD | .383 |
| Indirect process contact | MGD | |
| Non-contact ancillary uses | MGD | .066 |
| Sanitary and potable water | MGD | .007 |
| Storm water (collected in treatment system) | MGD | -0- |
| Other (specify) | MGD | .075 |

D. Process Wastewater Discharged to:

| | | |
|---|---|---|
| Surface water or storm sewer | MGD | |
| Treated | MGD | |
| Untreated | MGD | |
| Municipal Sewage Treatment Plant | MGD | 0.569 |
| Deep Well | MGD | |
| Other (specify and describe briefly) | MGD | |

If process wastewater is discharged to a municipal treatment plant, answer the following questions:

Name of Treatment Plant Elyria Sewage Disposal Plant

City Elyria State Ohio

Is discharge to municipal sewage treatment plant pretreated?

[X] Yes [ ] No

If yes, describe pretreatment Partial treatment - 0.018 MGD neutralized, Cu and Cr removal 0.002 MGD, solids removal (filt.) 0.054 MGD, 0.051 MGD solids removal in settling ponds (1973 survey)

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

If discharge to surface water, what is the name of the receiving water? Due to layout of city sewer system (combination) bulk of wastewater from plant overflows to Black River.

2. Water Reuse:

Attach a separate sheet of paper describing each water recirculation and reuse system in your plant. Include process water and non-contact cooling water. Specify the blowdown control systems in operation (i.e., the volume and percent of blowdown and the basis, such as TDS, chromium, phosphate, pH, temperature, etc.) Attach a flow diagram of the system and identify that portion(s) common to all categories of products manufactured at your plant and that portion(s) specific to only inorganic chemicals.

3. Quality of Water Discharged:

Attach all in-plant and treatment plant influent and effluent water analysis data obtained from January 1, 1975 to June 30, 1976. Include flow rates and all parameters analyzed, such as (but not limited to) $BOD_5$, COD, TOC, TSS, TDS, ammonia, TKN, cyanide (total/oxidizable), chromium (total/hexavalent), oil and grease, sulfites, sulfides, free chlorine, wastewater and ambient air temperature, significant metals and specific organic compounds. Clearly describe the location of each sampling point and describe the source(s) of wastewater (e.g., untreated or treated process wastewater from the $TiO_2$ washing process, non-contact cooling water blowdown, etc.). Include daily production figures for each product identified in Part I, Questions 7 and 8.

In addition, summarize this data by completing Tables A, B, C and D, as per the instructions which follow. Information regarding influent and effluent waste loads of each wastewater treatment facility is requested in Tables A and C, respectively. Table B requests data on each untreated wastewater discharge point. Table D requests waste loads from each individual production process. If data for individual waste streams is not available, information for combined waste streams should be furnished which represents the greatest degree of detail available. The tables are located at the end of this section.

Instructions for Completing Tables A, B, C and D:

For Tables A, B, C and D use the following definitions and notes.

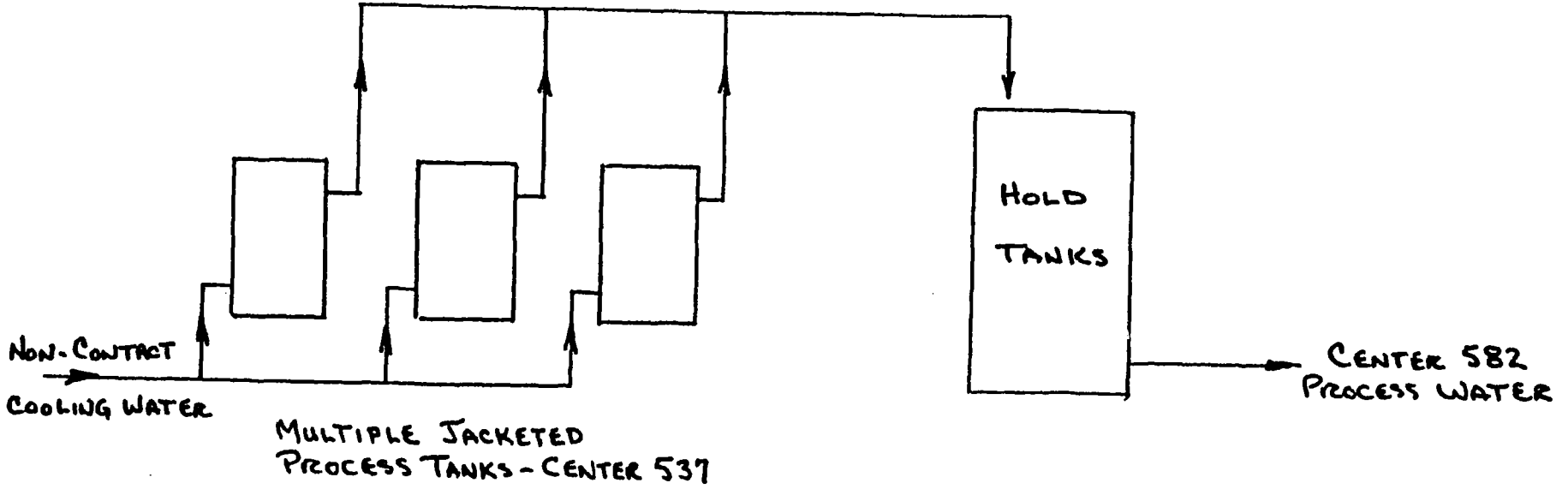
Flow - Do not include rainfall runoff, unless it is collected in the treatment system. If collected, estimate the percent of total flow which is attributed to this source.

Average day - Should represent the average of the data period covered.

PART II
QUESTION 2. WATER REUSE

NOTE:

NON-CONTACT COOLING WATER FROM DEPT. 537 IS DISCHARGED INTO DEPT. 582 FOR REUSE AS PROCESS WATER. FRESH WATER ENTERS SAME HOLD TANK ON DEMAND WHEN COOLING WATER IS UNAVAILABLE IN SUFFICIENT QUANTITY.



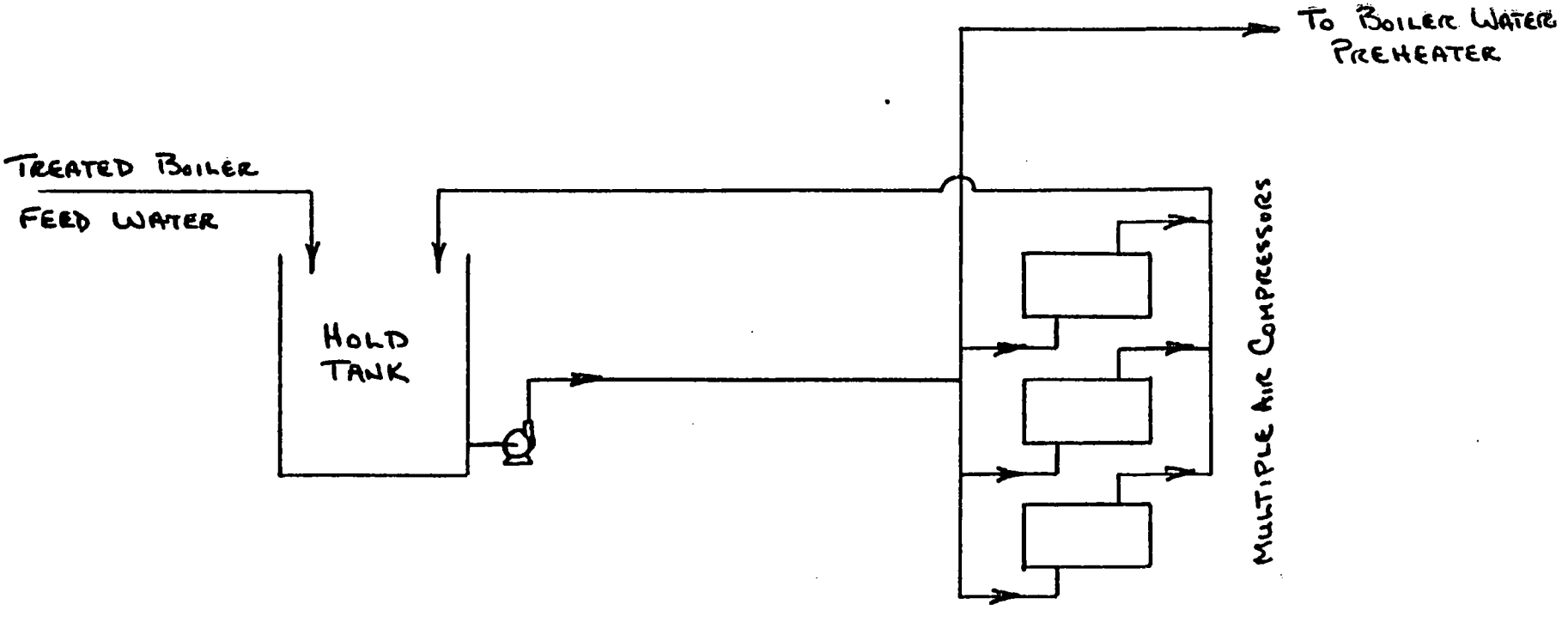

1-20-77
CAK

PART II

QUESTION 2. WATER REUSE

NOTE:

TREATED BOILER FEEDWATER IS CIRCULATED THRU COMPRESSOR AND AFTERCOOLER JACKETS TO RECOVER HEAT & COOL AIR & COMPRESSORS BEFORE PASSING TO PREHEATER.




1-20-77
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The Harshaw Chemical Company
Elyria Plant
Elyria, Ohio

Part II

Question 3

Flowrates

During past couple of years two different types of flow meters have been installed at the Locust & John Street and concrete tower monitoring points. To date the first type has been discarded and returned to vendor, while the second type (ultrasonic flame level device) is still not operational while we wait for the manufacturer to correct deficiencies. Consequently no reliable flow data is available for our monitoring stations.

Monitoring Stations

Locust & John Street Catchbasin. Monitors partially treated (portion of stream neutralized) process wastewater from entire South plant production areas.

Concret Tower. This sampling station monitors partially treated (portion treated for Cu-Cr removal and filtered, another portion filtered) process wastewater from North plant production areas.

Daily production figures for products identified in Part I, Questions 7 and 8, are not available.

Table A

Zirconium Ponds - collects wastewater from this department and permits settling of suspended solids. Floating pump discharges supernate to sewer system which discharges into South Pollution Treatment Facility. Pond solids are periodically removed and trucked to independent land fill. No influent or effluent data has been taken.

South Pollution Facility - Receives wastewater from Zirconium Department pond and sump, Department 585, 586, 537, and 582. No influent or effluent data has been taken for the individual products, departments or for the combined influent to or effluent from the system.

North Pollution Facilities - These consist of a treatment area for Copper-Chrome wastewater which precipitated Cu and Cr, followed by filtration to remove these metals from the wastewater stream. No influent data, except for a few isolated grab samples, have been taken.

A filtration system to handle wastewater from Department

The Harshaw Chemical Company
Elyria Plant
Elyria, Ohio

Part II

Question 3 (Cont'd)

541, 539, 548, 573 and 546. Wastewater is passed thru a filter to remove suspended solids. No influent or effluent data has been taken.

Table B

Wastewater from this plant is monitored at two discharge points. Both streams are only partially treated so they will be included in this table as untreated wastewater.

This table will contain analytical data from the Locust & John Street monitoring station and the concrete tower monitoring station. These are the only influent or effluent points monitored in this plant, except for the Cu-Cr treatment system and are combinations of wastewater from large areas.

Table C

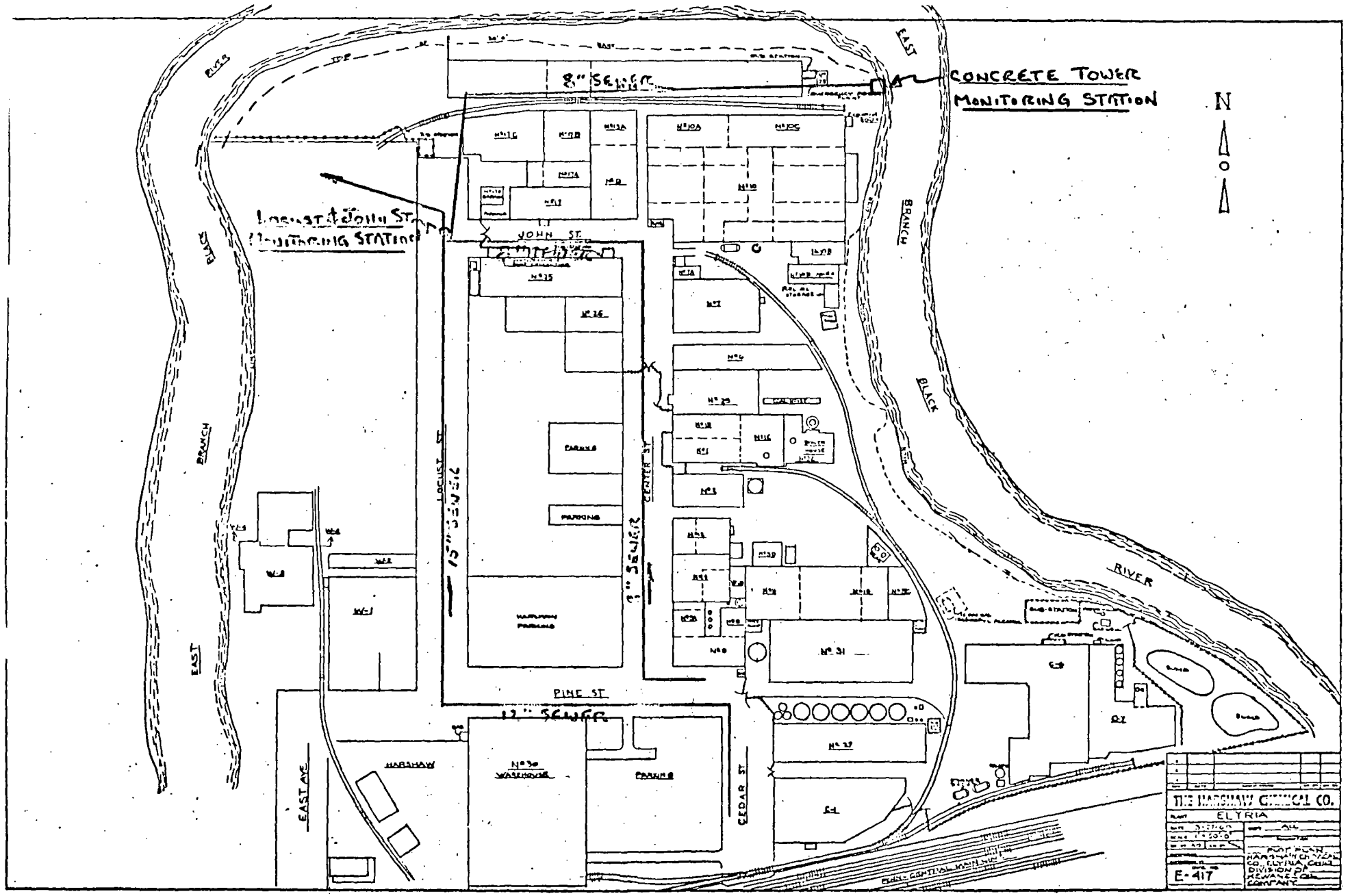
Generally not applicable since we have only partial treatment of our wastewater. We do however have data on the Cu-Cr treatment system only, which we have placed in this table.

Table D

Not applicable. No data is available or has been taken for individual products or departments (except for data in Table C from the Cu-Cr treatment system).

The following Plant Data is attached:

Table No. E 307-12-3-T-36 Pages 1 thru 7
E 366-1-1-T-1
E 366-1-1-T-2
E-307-12-7-T-2 Pages 25 thru 73


8" SEWER
CONCRETE TOWER
MONITORING STATION
N
Locust & John St.
Monitoring Station
JOHN ST
LOCUST ST
15" SEWER
CENTER ST
8" SEWER
PINE ST
12" SEWER
EAST AVE
CEDAR ST
HARSHAW
No 30
WAREHOUSE
PARKING
No 31
EAST BRANCH BLACK RIVER
BLACK BRANCH EAST
THE HARSHAW CHEMICAL CO.
PLANT ELYRIA
E-417
PLOT PLAN
HARSHAW CHEMICAL CO. ELYRIA, OHIO
DIVISION OF
KEWANEE OIL
COMPANY

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

Significant parameters - Those potential pollutants not specifically listed, but which are introduced into the waste streams as a result of materials used, product produced, process used and for which you have test data.

Identify all data which results from abnormal operating conditions.

Table A - Complete Table A for the combined influent to each treatment facility.

Table B - Complete Table B for each untreated waste discharge point (to surface waters, deep wells, land application, etc.)

Table C - Complete Table C for the treated effluent from each treatment facility. Not applicable to plants that have not yet installed waste treatment facilities. This section is not restricted by type of treatment.

Table D - Complete Table D for the process wastewaters from each of the product/process lines identified in Part I. Do not include non-contact cooling waters but do include all contact cooling waters. If measured values are not known or not available, supply the best estimate available and specify the basis for the estimate.

4. The method of sample collection for the data supplied in response to Question 3, Tables A, B, C and D, should be specified (e.g., daily grab sample, 8 hour flow composited, 24 hour continuous, etc.)

5. Were EPA-approved methods of analysis used in developing data reported in response to Question 3, Tables A, B, C and D?

[X] Yes [ ] No

If no, the methods of analysis should be indicated_____

_____

_____

6. Has the seed used in the $BOD_5$ test been acclimated to the wastewaters that have been tested?

[ ] Yes [ ] No COD test is run instead of BOD

The Harshaw Chemical Company
Elyria Plant
Elyria, Ohio

Part II

Question 4

Composites of six grab samples daily. Samples taken at approximate 4 hour intervals.

Question 5

Yes, EPA-approved analysis methods are used.

Question 6

No BOD analyses are performed-unnecessary.

Question 7

To best of our knowledge, during the period of concern to this report, unknown quantities of cooling water were being discharged to the city sewer system. Current efforts are directed to possibly reuse as process water.

Question 8

Startup or shutdown operations, due to our usual batch type operations, have not affected our treatment systems seriously.

If yes, what is the source of the seed

A ☐ sewage treatment plant

B ☐ plant treatment facility

C ☐ laboratory acclimation

D ☐ other explain_____

7. Do leaks of process wastewater or materials into non-contact cooling water occur?

☐ Yes ☒ No

If yes, complete the following:

(a) Is data based on:

☐ (A) Records

☐ (B) Best Estimate, Basis_____

_____

(b) Source of Leaks_____

_____

(c) Frequency_____

_____

(d) Quantity Leaked_____gallon/day

(e) Material(s) Leaked_____

_____

(f) Average Duration of Shutdown for repair_____days

8. Do start-up and/or shutdown operations adversely affect wastewater volume and characteristics?

☐ Yes ☒ No

If yes, complete the following:

(a) Identify affected waste streams_____

_____

_____

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

(b) Describe the quantitative and qualitative changes in the wastewater _____

_____

_____

(c) Average number of start-ups/shutdowns per month _____

(d) Average duration of start-ups _____ hours

(e) Average duration of shutdowns _____ hours

(f) Are by-pass or equalization facilities available for these wastewaters?

☐ Yes ☐ No

If yes, explain _____

_____

_____

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

INORGANIC CHEMICALS CATEGORY

PART III - TREATMENT TECHNOLOGY

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U. S. EPA (WH-552)
Washington, D. C. 20460

A. Do you have a treatment facility(ies) at this plant?

[X] Yes

[ ] No

If yes, complete the following and attach a flow sheet indicating waste streams treated, unit sizes of treatment equipment, detention times, recycle rates, effluent concentration or design criteria, and other pertinent engineering information for the operation of each treatment facility. Include treatment of storm runoff, where applicable. For each facility complete the following:

(North Pollution Control)

Name of Facility Copper--Chrome Treatment - Solids Separation

Source(s) of Wastewater Departments 556, 581, 541, 539, 548, 573 and 546 -- All Process Wastewater

| | Year | Cost (1976 Dollars) |
|---|---|---|
| 1. Original installation (battery limits only-do not include cost of land, collecting sewers, in-plant piping, pumping stations, etc.) | 1975 | 222,000 |
| 2. Estimated replacement cost | 1976 | 266,000 |
| 3. Estimated total capital expenditure for this facility to date. | | |
| 4. Annual cost of operation and maintenance (exclude depreciation and debt service) | | 70,000 |

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

5. List major modifications or additions since original installation and state the purpose of the modification or addition.

| Modification-Addition | Treatment Facility | Year | Cost (1976 Dollars) | Purpose of Modification |
|---|---|---|---|---|
| None | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

6. List planned modifications or additions and estimated date of completion and state the purpose of the modification or addition.

| Modification-Addition | Treatment Facility | Year | Cost (1976 Dollars) | Purpose of Modification |
|---|---|---|---|---|
| Additional tanks and pumps | | 1977 | 198,000 | Transfer to South Pollution control for pH adjust. |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

7. Is nutrient addition practiced:

☐ Yes ☒ No

8. How many employees (equivalent man-years/year) are primarily engaged in the operation of the treatment facility?

1.5 estimated

9. Is an operator always present?

☐ Yes ☒ No

10. Quantity of wastewater treatment facility solid wastes disposed of at present (dry basis)

estimated 475 lbs/day

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

11. Moisture content of waste solids disposed of at present

45--60 % moisture

12. Present disposition of solids

Browning Ferris Industries -- Landfill

13. Estimated annual cost of solids handling and disposal (1976 Dollars)

unknown $/ton dry basis

14. Planned future disposition of solids:

as in 12 above

15. Does runoff from solids disposal areas occur?

☐ Yes ☐ No

16. Is runoff from solids disposal areas collected and treated?

☐ Yes ☐ No

If yes, describe collection system and fate of collected runoff

unknown

17. Does leaching from disposal areas occur?

☐ Yes ☐ No

If yes, how is this controlled?

unknown

18. What are the total annual energy requirements for the treatment facility?
not metered KwHr _____ Btu

B. Carbon Sorption Technology

| | | |
|---|---|---|
| Have you determined carbon sorption isotherms on your wastewaters? | ☐ Yes | ☒ No |
| Have carbon sorption isotherms been determined for wastewaters from your plant(s) by a person or persons other than company personnel? | ☐ Yes | ☒ No |
| Have you or anyone else evaluated carbon columns on wastewaters from this plant? | ☐ Yes | ☒ No |

Do you have carbon sorption data from your plant(s) on:

| | | |
|---|---|---|
| raw wastes | ☐ Yes | ☒ No |
| biologically treated wastes | ☐ Yes | ☒ No |
| individual process lines | ☐ Yes | ☒ No |
| combined process lines | ☐ Yes | ☒ No |
| pilot plant studies | ☐ Yes | ☒ No |
| contractor evaluations | ☐ Yes | ☒ No |
| cost evaluations | ☐ Yes | ☒ No |
| plant scale evaluations | ☐ Yes | ☒ No |
| operational units | ☐ Yes | ☒ No |

For each question above which was answered affirmatively give a brief description of the data (source and types of wastes, period of time covered, plant involved, extent of data base and contact personnel suggested) in the space below:

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

C. Filtration

Have filtration studies been performed on your wastewaters? (sand, multi-media, etc.) ☐ Yes ☒ No

If yes, give a brief description of the data (source and types of wastes, period of time covered, extent of data base, conclusions of study, and contact personnel suggested) in the space below:

D. Biological Treatment

Have biological treatability studies been conducted on your wastewaters beyond what was described in Section A, Part III? ☐ Yes ☒ No

If yes, give a brief description of the data and results (source and types of wastes treated, duration of the study, extent of data base, conclusions of study, and contact personnel suggested) in the space below:

E. Have other treatability studies employing treatment processes such as sedimentation, neutralization, hydrolysis, precipitation, oxidation/reduction, ion exchange, phenol recovery, etc., been run on any of the process wastewater streams from the plant? [X] Yes [ ] No

If yes, list those product/process streams from which such treatability studies were conducted.

Cu--Cr --Electrochemical Tests

Solids Removal -- Fluoride Removal Tests

Corporation The Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

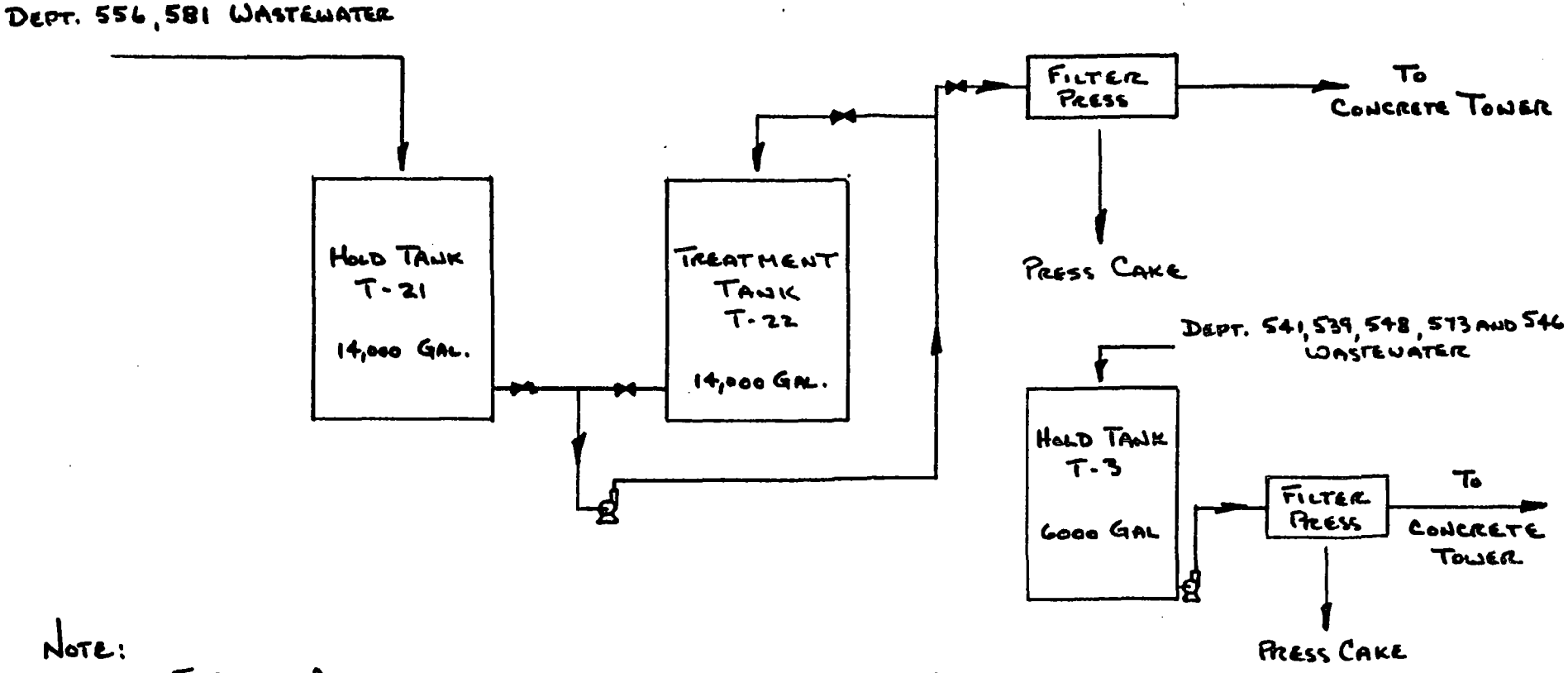
F. Please indicate any comments that you may have that might be beneficial to the conduct of this study to develop effluent guidelines and standards of performance for the manufacture of inorganic chemicals.

None

# Copper - Chrome Treatment System

## Solids Separation System

1-24-77
CAK




Note:

T-21 All dept. wastewater is accumulated

T-22 Batch treatment in 12,000 gal. increments as necessary

T-3 Pumping rate to press exceeds influent rate — No overflow from T-3

Corporation Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

INORGANIC CHEMICALS CATEGORY

PART III - TREATMENT TECHNOLOGY

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U. S. EPA (WH-552)
Washington, D. C. 20460

A. Do you have a treatment facility(ies) at this plant?

[X] Yes

[ ] No

If yes, complete the following and attach a flow sheet indicating waste streams treated, unit sizes of treatment equipment, detention times, recycle rates, effluent concentration or design criteria, and other pertinent engineering information for the operation of each treatment facility. Include treatment of storm runoff, where applicable. For each facility complete the following:

Name of Facility Center 540 - Settling Ponds

Source(s) of Wastewater Department 540

| | Year | Cost (1976 Dollars) |
|---|---|---|
| 1. Original installation (battery limits only-do not include cost of land, collecting sewers, in-plant piping, pumping stations, etc.) | 1969 | 30,000 |
| 2. Estimated replacement cost | 1977 | 40,000 |
| 3. Estimated total capital expenditure for this facility to date. | | Unknown |
| 4. Annual cost of operation and maintenance (exclude depreciation and debt service) | | 40,000 Estimate |

Corporation Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

5. List major modifications or additions since original installation and state the purpose of the modification or addition.

| Modification-Addition | Treatment Facility | Year | Cost (1976 Dollars) | Purpose of Modification |
|---|---|---|---|---|
| None | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

6. List planned modifications or additions and estimated date of completion and state the purpose of the modification or addition.

| Modification-Addition | Treatment Facility | Year | Cost (1976 Dollars) | Purpose of Modification |
|---|---|---|---|---|
| Tanks, Pumps, Etc. | | | 98,000 | Neutralization of Effluent |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

7. Is nutrient addition practiced:

☐ Yes ☒ No

8. How many employees (equivalent man-years/year) are primarily engaged in the operation of the treatment facility?

4 Manweeks/Yr. - 0.08 Manyears

9. Is an operator always present?

☐ Yes ☐ No

10. Quantity of wastewater treatment facility solid wastes disposed of at present (dry basis)

Estimate 1000 lbs/day

Corporation Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

11. Moisture content of waste solids disposed of at present

95 % moisture

12. Present disposition of solids

Tank Truck to Landfill

13. Estimated annual cost of solids handling and disposal (1976 Dollars)

287 $/ton dry basis

14. Planned future disposition of solids:

Elyria Sewage Disposal Plant

15. Does runoff from solids disposal areas occur?

☐ Yes ☐ No

16. Is runoff from solids disposal areas collected and treated?

☐ Yes ☐ No

If yes, describe collection system and fate of collected runoff

Unknown

17. Does leaching from disposal areas occur?

☐ Yes ☒ No

If yes, how is this controlled?

Corporation Ha. .aw Chemical Company

Plant Elyria

City Elyria State Ohio

18. What are the total annual energy requirements for the treatment facility?

unknown KwHr _____ Btu

B. Carbon Sorption Technology

| | | |
|---|---|---|
| Have you determined carbon sorption isotherms on your wastewaters? | ☐ Yes | ☒ No |
| Have carbon sorption isotherms been determined for wastewaters from your plant(s) by a person or persons other than company personnel? | ☐ Yes | ☒ No |
| Have you or anyone else evaluated carbon columns on wastewaters from this plant? | ☐ Yes | ☒ No |
| Do you have carbon sorption data from your plant(s) on: | | |
| raw wastes | ☐ Yes | ☒ No |
| biologically treated wastes | ☐ Yes | ☒ No |
| individual process lines | ☐ Yes | ☒ No |
| combined process lines | ☐ Yes | ☒ No |
| pilot plant studies | ☐ Yes | ☒ No |
| contractor evaluations | ☐ Yes | ☒ No |
| cost evaluations | ☐ Yes | ☒ No |
| plant scale evaluations | ☐ Yes | ☒ No |
| operational units | ☐ Yes | ☒ No |

For each question above which was answered affirmatively give a brief description of the data (source and types of wastes, period of time covered, plant involved, extent of data base and contact personnel suggested) in the space below:

C. Filtration

Have filtration studies been performed on your wastewaters? (sand, multi-media, etc.) [X] Yes [ ] No

If yes, give a brief description of the data (source and types of wastes, period of time covered, extent of data base, conclusions of study, and contact personnel suggested) in the space below:

Very limited testing indicated filtration impractical - based on Buchner test on Silicate Type Gel Solids.

D. Biological Treatment

Have biological treatability studies been conducted on your wastewaters beyond what was described in Section A, Part III? [ ] Yes [X] No

If yes, give a brief description of the data and results (source and types of wastes treated, duration of the study, extent of data base, conclusions of study, and contact personnel suggested) in the space below:

Corporation Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

E. Have other treatability studies employing treatment processes such as sedimentation, neutralization, hydrolysis, precipitation, oxidation/reduction, ion exchange, phenol recovery, etc., been run on any of the process wastewater streams from the plant? [X] Yes [ ] No

If yes, list those product/process streams from which such treatability studies were conducted.

Settling and Neutralization, with limited bench test, uneconomical and impractical, to improve filtration.

Corporation Harshaw Chemical Company

Plant Elyria

City Elyria State Ohio

F. Please indicate any comments that you may have that might be beneficial to the conduct of this study to develop effluent guidelines and standards of performance for the manufacture of inorganic chemicals.

None

TABLE NO. E-3-1-12-3-T-36 PAGE 2

# ELYRIA PLANT SEWER SAMPLING

LOCATION CONCRETE TOWER

| | SAMPLING DATE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 9-24-75 | 9-30-75 | 10-9-75 | 10-8-75 | 10-22-75 | 10-29-75 | 11-4-75 | 11-12-75 |
| E-307-12-3- | 801 | 803 | 805 | 807 | 809 | 811 | 813 | 815 |
| TOTAL SOLIDS | 1080 | 1428 | 1350 | 5094 | 633 | 453 | 1251 | 1536 |
| DISSOLVED SOLIDS | 1020 | 1220 | 1302 | 5051 | 513 | 423 | 1085 | 1383 |
| SUSPENDED SOLIDS | 60 | 208 | 48 | 43 | 120 | 30 | 166 | 153 |
| OIL & GREASE | 1.0 | 2.6 | 3.5 | 5.1 | 5.2 | 4.9 | 5.0 | 22.9 |
| pH | 8.3 | 6.9 | 8.1 | 7.5 | 6.8 | 4.4 | 7.9 | 7.2 |
| Cu | 22.0 | 62.8 | 4.70 | 4.9 | 5.88 | 7.18 | 5.80 | 4.81 |
| Cr | 0.82 | 1.49 | 0.20 | 0.91 | 0.53 | 0.36 | 0.25 | 0.54 |
| Zn | 0.48 | 1.05 | 0.43 | 0.63 | 2.58 | 1.98 | 1.51 | 0.62 |
| Pb | 0.80 | 0.50 | 2.00 | 1.54 | 4.02 | 1.33 | 7.39 | 2.25 |
| Ni | 0.17 | 0.31 | 6.33 | 0.37 | 1.25 | 1.41 | 0.78 | 2.43 |
| Cd | 0.34 | 0.14 | 0.20 | 0.25 | 1.38 | 0.31 | 0.76 | 0.54 |
| Hg | 0.001 | 0.056 | 0.009 | 0.005 | 0.003 | 0.001 | 0.006 | 0.002 |
| $NH_3$ AS N | <1.0 | 4.8 | 1.0 | 926 | 14.9 | 2.6 | 3.5 | 100 |
| Al | 2.17 | 37.2 | 6.25 | 4.78 | 5.75 | 6.28 | 11.50 | 3.95 |
| As | | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 | <0.25 |
| Ba | 0.53 | 0.54 | 0.40 | 1.09 | 9.80 | 2.21 | 1.06 | 0.61 |
| Co | 0.11 | 0.28 | 0.08 | 0.12 | 0.24 | 0.71 | 0.74 | 0.68 |
| Fe | 0.93 | 3.03 | 1.10 | 0.57 | 1.56 | 1.10 | 1.00 | 1.02 |
| Mo | | 0.13 | 0.70 | 0.11 | 0.27 | 0.27 | 0.16 | 0.20 |
| PHOSPHATES -- P | | 1.2 | | <1.0 | 1.0 | <1.0 | 1.2 | 31 |
| Se | | | | | | | | |
| Ag | | | | | | | | |
| Te | | | | | | | | |
| Tl | | | | | | | | |
| CYANIDES | | | | | | | | |
| FLUORIDES | | | 62 | 10.5 | 14.3 | 2.8 | 59.8 | 1.2 |
| PHENOLS | | | | | | | | |
| BOD | | | | | | | | |
| COD | | 39 | 22 | 145 | 72 | 202 | 63 | 286 |
| TEMPERATURE °F | 88 | 85 | 88 | | | | | |

ALL CONCENTRATIONS IN MILLIGRAMS PER LITER EXCEPT pH AND [illegible]

THE HARSHAW CHEMICAL COMPANY
PROCESS ENGINEERING LAB.

CHG. NY

DATE

HARSHAW 885

O.M.B. Approved 158-R-0160

PART - I

GENERAL INFORMATION
INORGANIC CHEMICALS CATEGORY

To be returned within 60 days of receipt to:

Robert B. Schaffer, Director
Effluent Guidelines Division
U.S. EPA (WH-552)
Washington, D.C. 20460

1. Name of Corporation HARSHAW CHEMICAL COMPANY

2. Address of Corporation Headquarters

Street: 1945 East 97th Street

City: Cleveland

State: Ohio Zip Code 44106

3. Name of Plant

Elyria

4. Address of Plant

Street: 113 John Street

City: Elyria

State: Ohio Zip Code 44035

5. Name(s) of corporation or plant personnel to be contacted for information pertaining to this data collection portfolio.

| Name | Title | (Area Code) Telephone |
|---|---|---|
| F. G. Troppe | Manager, Environment Control | (216) 721-8300 |
| | | |
| | | |

6. **Products produced at this plant:**

Indicate which of the products shown in List 1 (Inorganic Chemicals-page 3) that you produce at this site and the average annual production rate during the period (1) January 1, 1979 through June 30, 1980 (2). If there is more than one process type for a given product, identify and list each separately.

| Product[1] | Process Type and Year of Installation | Plant Design Capacity (lbs/day) | Average (2) Annual Production Rate (tons/year) | Number of Days per Year Operating | Mode of Operation (Batch or Continuous) |
|---|---|---|---|---|---|
| Copper Nitrate* Code 585-026 | Reaction 1974 | 1402# as Cu | 15 as Cu | 21 | Batch |
| Copper Nitrate * Code 556-019 | Reaction 1979 | 2460# as Cu | 96 as Cu | 78 | Batch |
| | | | | | |
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(1) Produced in commercial grade (bulk) quantities, i.e., excluding reagent grade or specialty chemicals produced in small quantities, i.e., less than 10,000 lb/year..

(2) Note other time period if used instead of the one suggested.



*The copper nitrate is produced as an intermediate and consumed internally

LIST 1

INORGANIC CHEMICALS

1. Ammonium Thiosulfate
2. Bromide Chemicals
   a. Sodium b. Ammonium c. Potassium d. Calcium
3. Cadmium Compounds
   a. Sulfate b. Chloride c. Nitrate
4. Cadmium Pigments
5. Calcium Hypochlorite
6. Cobalt Compounds
   a. Sulfate b. Chloride c. Nitrate
7. Copper Carbonate
8. Copper Compounds
   a. Chloride b. Nitrate c. Iodide
9. Iron Oxides and Iron Pigments
   a. Iron Oxide, black b. Iron Oxide, yellow c. Iron Oxide, magnetic
   d. Ochers e. Stennas f. Umbers
10. Nickel Salts
    a. Carbonate b. Chloride c. Nitrate d. Fluoborate
11. Nitrous Oxide
12. Potassium Copper Cyanide
13. Silica Gel
14. Silica Amorphous
15. Sodium Chlorate
16. Tin Fluoborate
17. Zinc Chloride
18. Chlorosulfonic Acid
19. Rare Earth Metal Salts

7. For each product identified in response to Item 6, please attach a process flow diagram showing the process flow stream, materials entering into the process and waste flows from each unit process, including barometric condensers, noncontact cooling, scrubbers, air pollution control devices, and all Unit Operations. Show direction of water inputs and waste outflows and show waste water reuse/recycle, where applicable.

8. Attach additional pages as needed to describe the process modifications made to each process identified in response to Question 6 since January 1, 1979 that affect either the volume of waste water, or the amount of pollutants originating from that process. Explain the purpose behind each of these modifications. Give your best estimate as to the technological age of each process installation as it now exists.--MODERN

9. For each product indicated in response to Question 6 of Part I, show raw materials by ore or chemical name, additives, catalysts, impurities, reaction products or chemicals that could enter waste water from the process.

| Product | Raw Materials | Additive/Catalyst | Solvents | Known Impurities and Process Contaminants |
|---|---|---|---|---|
| Copper Nitrate 585-026 | Copper Oxide Nitric Acid, Water | -- | -- | -- |
| Copper Nitrate 556-019 | Copper Oxide Nitric Acid, Water | -- | -- | -- |
| | | | | |
| | | | | |
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PART II

WATER USE, DISCHARGE, AND RESIDUAL (SOLID, SLUDGE)
GENERATION AND DISPOSAL PRACTICES
INORGANIC CHEMICALS CATEGORY

1. Water Use and Disposition: Total Plant Needs

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of waste waters. If a time period other than January 1, 1979 to June 30, 1980 is used, please indicate below. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product).

Product(s) Copper Nitrate

Process(s) 585-026

Time Period Reported 1-1-79 thru 6-30-80

A. Water Source:

| | |
|---|---|
| Municipal----------Gallons per day | 2,887 |
| Surface----------Gallons per day | None |
| Ground----------Gallons per day | None |
| Other (specify)----------Gallons per day | None |

B. Uses:

| | |
|---|---|
| Noncontact cooling---------Gallons per day | None |
| Direct process contact (as diluent, solvent carrier, reactant, by-product, cooling, etc.------Gallons per day | 2,071 |
| Indirect process contact (pumps, seals, leaks, spills, etc.)----------Gallons per day | Unknown |
| Maintenance, equipment cleaning and work area washdown----------Gallons per day | 66 |
| Air pollution control-------Gallons per day | 85 |
| Noncontact ancillary uses boilers, utilities, etc.)---Gallons per day | 427 |
| Sanitary and potable water--Gallons per day | 237 |
| Other (specify)----------Gallons per day | None |

C. Source of Waste Water Flow:

| | |
|---|---|
| Noncontact cooling----------Gallons per day | None |
| Direct process contact------Gallons per day | None |
| Indirect process contact----Gallons per day | None |
| Noncontact ancillary uses---Gallons per day | None |
| Sanitary and potable water--Gallons per day | 237 |
| Storm water (collected in treatment system)----------Gallons per day | None |
| Other (specify)------------Gallons per day | None |

D. Process Waste Water Discharged To:

| | |
|---|---|
| Surface water or storm-sewer----------Gallons per day | None |
| Treated--------------Gallons per day | NA |
| Untreated------------Gallons per day | NA |
| Municipal Sewage Treatment Plant----------Gallons per day | 100% less evaporation & |
| Deep Well----------Gallons per day | None product |
| Other (specify and describe briefly)----------Gallons per day | None water |

E. If Waste Water Discharged To:

a) Surface water

| | |
|---|---|
| (i) Name of the receiving water | NA |
| (ii) Plant NPDES permit number(s) and date(s) granted | NA |
| (iii) If no permit, application number | NA |
| date of application | NA |

b) Municipal Treatment Plant

| | |
|---|---|
| (i) Name of Treatment Plant | -- |

City Elyria State Ohio

(ii) Is discharge to municipal sewage treatment plant pretreated?

X Yes __ No

If yes, describe the pretreatment system briefly and indicate the percent of the waste water that is pretreated.

PH control and/or precipitation and/or filtration

All waste water is pretreated except for sanitary waste

c) (i) Land (describe) NA

(ii) Other (describe) NA

PART II

WATER USE, DISCHARGE, AND RESIDUAL (SOLID, SLUDGE)
GENERATION AND DISPOSAL PRACTICES
INORGANIC CHEMICALS CATEGORY

1. Water Use and Disposition: Total Plant Needs

For each process at your plant producing a product identified in List 1 in Part I, list the sources and quantities of water used in the process and describe the disposition of waste waters. If a time period other than January 1, 1979 to June 30, 1980 is used, please indicate below. Use a separate sheet for each product (or process where more than one process is used at the plant to produce a particular product).

Product(s) Copper Nitrate

Process(s) 556-019

Time Period Reported 1-1-79 thru 6-30-80

A. Water Source:

| | |
|---|---|
| Municipal----------Gallons per day | 5,753 |
| Surface----------Gallons per day | None |
| Ground----------Gallons per day | None |
| Other (specify)----------Gallons per day | None |

B. Uses:

| | |
|---|---|
| Noncontact cooling---------Gallons per day | None |
| Direct process contact (as diluent, solvent carrier, reactant, by-product, cooling, etc.------Gallons per day | 690 |
| Indirect process contact (pumps, seals, leaks, spills, etc.)----------Gallons per day | Unknown |
| Maintenance, equipment cleaning and work area washdown----------Gallons per day | 66 |
| Air pollution control-------Gallons per day | 4,744 |
| Noncontact ancillary uses boilers, utilities, etc.)---Gallons per day | 151 |
| Sanitary and potable water--Gallons per day | 102 |
| Other (specify)----------Gallons per day | None |

C. Source of Waste Water Flow:

| | |
|---|---|
| Noncontact cooling----------Gallons per day | None |
| Direct process contact------Gallons per day | None |
| Indirect process contact----Gallons per day | None |
| Noncontact ancillary uses---Gallons per day | None |
| Sanitary and potable water--Gallons per day | 102 |
| Storm water (collected in treatment system)----------Gallons per day | None |
| Other (specify)-------------Gallons per day | None |

D. Process Waste Water Discharged To:

| | |
|---|---|
| Surface water or storm-sewer----------Gallons per day | None |
| Treated--------------Gallons per day | NA |
| Untreated------------Gallons per day | NA |
| Municipal Sewage Treatment Plant----------Gallons per day | 100% less evaporation & product wate |
| Deep Well----------Gallons per day | None |
| Other (specify and describe briefly)----------Gallons per day | None |

E. If Waste Water Discharged To:

| | |
|---|---|
| a) Surface water | |
| (i) Name of the receiving water | NA |
| (ii) Plant NPDES permit number(s) | NA |
| and date(s) granted | NA |
| (iii) If no permit, application number | NA |
| date of application | NA |
| b) Municipal Treatment Plant | |
| (i) Name of Treatment Plant | -- |

City Elyria State Ohio

(ii) Is discharge to municipal sewage treatment plant pretreated?

X Yes __ No

If yes, describe the pretreatment system briefly and indicate the percent of the waste water that is pretreated.

pH control, precipitation, filtration

c) (i) Land (describe) NA

(ii) Other (describe) NA

2. For any direct or indirect process contact waste water generated from the manufacture of any product in List 1, please supply all existing analytical data for each pollutant monitored for each waste stream sampled (see list below) for each day sampled during the period from January 1, 1979 through June 30, 1980. Please also indicate the flow measured or estimated for each day sampled at each location sampled, state whether the flow was measured or estimated, and the measuring device used or the basis for estimating. Do not include rainfall runoff, unless it is collected in the treatment system. If it is collected, estimate the percent of the total flow which is attributed to rainfall runoff.

Waste Water Streams: Discharge from Product Process
Influent to Treatment System
Effluent from Treatment System
Discharge to Receiving Water (Identify)
Discharge to POTW

For each waste stream; indicate the sample point (per flow diagram) and every product included in the waste water stream at the sample point when sampled.

3. The method of sample collection for the data supplied in response to question 2 should be specified e.g., daily grab sample, 8-hour flow composited, 24-hour continuous, etc.

4. Were EPA-approved methods* of analysis used in developing data reported in response to question 2?

X Yes _____No

If no, the methods of analysis should be indicated_____
_____
_____

5. Has the seed used in the $BOD_5$ test been acclimated to the waste waters that have been tested?

NA _____Yes _____No

If yes, what is the source of the seed?

A_____sewage treatment plant
B_____plant treatment facility
C_____laboratory acclimation
D_____other explain_____

NOTE: C.O.D. determinations have been made instead of BOD

*40 CFR 136

6. Do leaks of process waste water or materials into noncontact cooling water occur?

_____Yes _X_ No

If yes, complete the following:

(a) Is data based on:

__ (a) Records

__ (b) Best Estimate, Basis --

_____ --

(b) Source of Leaks _____ --

_____ --

(c) Frequency _____ --

_____ --

(d) Quantity Leaked _____ -- gallon/day

(e) Material(s) Leaked _____ --

_____ --

(f) Average duration of shutdown for repair -- days/year

7. Do start-up and/or shutdown operations adversely affect waste water volume and characteristics?

_____Yes _X_ No

If yes, complete the following:

(a) Identify affected waste streams _____ --

_____

_____

(b) Describe the quantitative and qualitative changes in the waste water

-- _____

-- _____

(c) Average number of start-ups/shutdowns per month -- _____

(d) Average duration of start-ups -- hours.

(e) Average duration of shutdowns -- hours.

(f) Are by-pass or equalization facilities available for these waste waters?

____ Yes _X_ No

If yes, explain --

8. Generation and Disposal of Residual Wastes

1. Please list sources of the residual waste generated from the process stream(s) and from the waste water treatment facility; give the estimated percent solids in each and indicate the characteristics of each residual waste in its final form for land disposal.

| | Source of Residual Waste | Chemical Treatment of Residual | Estimated Daily Quantity Produced | @ 200°C Percent Solids | Characteristics (From List Below) | Percent Disposed on-site |
|---|---|---|---|---|---|---|
| a | Copper Dept. | None | 0.50 ton | 15-45 | 4 | 0 |
| b | Ceramic Dept. | None | 0.20 ton | 65-90 | 4 | 0 |
| c | South Pollution | None | 0.40 ton | 10-35 | 4 | 0 |
| d | Misc. | None | 4.19 ton | >95 estimated | 13 | 0 |

1-acids
2-alkali
3-unreacted feed
4-heavy metals
5-solvents
6-chlorinated organics
7-paint sludges
8-cyanides
9-waste lube oil and cutting oils
10-inorganic sludges
11-organic sludges
12-other organics
13-other inorganics

2. Which of the above residuals are combined for treatment, on-site disposal, or shipment off-site? None

3. Total quantity of the residual waste disposed at present (dry basis)

____ lbs/month 1933 tons/year

4. What technology or specific residual waste processing or handling equipment is in place or planned for future installation? (e.g., chemical treatment system, thickener, filter, centrifuge, drumming facilities, etc.)

Plan to develop methods and equipment to reduce quantities and render some materials non-hazardous. Dryers, filters, drumming equipment, etc. are already in operation.

5. What type of disposal facilities are being used?

__ Own on-site landfill
__ Own off-site landfill
__ Chemical landfill
__ Contact hauling
__ Lagoon
__ On-site piles
X Others - describe Waiting to get an approval from a hazardous waste landfill

6. If the off-site disposal of solid/sludge waste is practiced, give:

Miles from plant to the chemical disposal site Not applicable (NA)

Transport and disposal charge per -- ton of solids
or per -- gallons of sludge

7. Residual wastes hauled from site are transported by

(a) our truck -- (b) contract hauler --

8. Containers used to ship residual wastes

(a) Tank -- (b) Drums -- (c) Dump truck -- (d) Other --

9. Is land available for expansion of on-site residual disposal facilities or waste water impoundments? NA

10. Are residual wastes stored? (a) No
(b) Less than 90 days? Yes
(c) More than 90 days? Yes, sometimes

## 9. Waste Water Impoundments

1. Number of:

(a) unlined impoundments used in waste water treatment None

surface area of each impoundment --

(b) lined impoundments used in waste water treatment None

surface area of each impoundment --

2. How many impoundments are (a) flow-through NA

(b) dead-end NA

3. Residual solids removed at (a) NA intervals

(b) NA left in place

4. Impoundments subject to flooding once in (a) 10 yrs NA
(b) 10-50 yrs NA
(c) 50-100 yrs NA

10. In Table A (Part II - Page 8) place a check (1) in the first column next to each material listed if the material was detected in any sample collected of process waste water disposed solids (2) in the second column next to each material listed if the material was not detected in every sample collected of process waste water disposed solids and (3) in the third column next to each material if the presence or absence of the material in process waste waters disposed solids has not been confirmed by appropriate chemical analysis.

11. If any of the compounds listed in Table A are indicated to be present in the process waste water disposed solids, give their concentrations. Also, list the possible origin of the compound (does it come from the raw materials in the process employed, a product, a by-product catalyst etc.).

| Description of Waste Stream | Compound Present (from Table A) | Conc. of Compound (mg/kg) | Source |
|---|---|---|---|
| Ceramic & South Pollution Controls | Antimony | 0-1% | Raws,products,etc |
| " " " | Cadmium | 0-1% | " " " |
| Cer, Cop. & " " | Chromium | 0.01-5% | " " " |
| " " " " " | Copper | 0.01-8% | " " " |
| " " " " " | Lead | 0-2% | " " " |
| " " " " " | Mercury | .001% | " " " |
| " " " " " | Nickel | 0.1 -5% | " " " |
| " " " " " | Silver | .001% | " " " |
| " " " " " | Zinc | 0.1 -5% | " " " |
| | | | |

12. Were EPA-approved methods of analysis used in developing data reported in Table A?

____ Yes X No

If no, the methods of analysis should be indicated
Qualitative Spectrographic Analysis

13. The method of sample collection for the data supplied in Table A should be specified.

Random, composite, and grab

## TABLE A

### TOXIC POLLUTANTS IN THE PROCESS WASTE WATERS AND SLUDGES

| Material | (Check the appropriate column) | | |
|---|---|---|---|
| **Inorganic Constituents** | **Present** | **Not Detected** | **Unknown** |
| 1. Antimony | X | X | |
| 2. Arsenic | | X | |
| 3. Asbestos | | | X |
| 4. Beryllium | | X | |
| 5. Cadmium | X | X | |
| 6. Chromium | X | | |
| 7. Copper | X | | |
| 8. Cyanide | | | X |
| 9. Lead | X | | |
| 10. Mercury | X | X | |
| 11. Nickel | X | | |
| 12. Selenium | | | X |
| 13. Silver | X | X | |
| 14. Thallium | | X | |
| 15. Zinc | X | | |
| **Organic Compounds** | | | |
| 1. Acenaphthene | | | X |
| 2. Acrolein | | | X |
| 3. Acrylonitrile | | | X |
| 4. Benzene | | | X |
| 5. Benzidine | | | X |
| 6. Carbon Tetrachloride | | | X |
| 7. Chlorobenzene | | | X |
| 8. 1,2,3,-Trichlorobenzene | | | X |
| 9. Hexachlorobenzene | | | X |

TABLE A - continued

| Material | (Check the appropriate column) | | |
|---|---|---|---|
| Organic Compounds - continued | Present | Not Detected | Unknown |
| 10. 1,2-Dichloroethane | | | X |
| 11. 1,1,1-Trichloroethane | | | X |
| 12. Hexachloroethane | | | X |
| 13. 1,1-Dichloroethane | | | X |
| 14. 1,1,2-Trichloroethane | | | X |
| 15. 1,1,2,2-Tetrachloroethane | | | X |
| 16. Chloroethane | | | X |
| 17. Bis(chloromethyl)ether | | | X |
| 18. Bis(2-chloroethyl)ether | | | X |
| 19. 2-Chloroethylvinyl ether | | | X |
| 20. 2-Chloronaphthalene | | | X |
| 21. 2,4,6-Trichlorophenol | | | X |
| 22. Parachlorometa cresol | | | X |
| 23. Chloroform | | | X |
| 24. 2-Chlorophenol | | | X |
| 25. 1,2-Dichlorobenzene | | | X |
| 26. 1,3-Dichlorobenzene | | | X |
| 27. 1,4-Dichlorobenzene | | | X |
| 28. 3,3-Dichlorobenzidine | | | X |
| 29. 1,1-Dichloroethylene | | | X |
| 30. 1,2-Trans-dichloroethylene | | | X |
| 31. 2,4-Dichlorophenol | | | X |
| 32. 1,2-Dichloropropane | | | X |
| 33. 1,2-Dichloropropylene | | | X |
| 34. 2,4-Dimethylphenol | | | X |
| 35. 2,4-Dinitrotoluene | | | X |
| 36. 2,6-Dinitrotoluene | | | X |
| 37. 1,2-Diphenylhydrazine | | | X |
| 38. Ethylbenzene | | | X |

TABLE A - continued

| Material | (Check the appropriate column) | | |
|---|---|---|---|
| Organic Compounds - continued | Present | Not Detected | Unknown |
| 39. Fluoranthene | | | X |
| 40. 4-Chlorophenyl phenyl ether | | | X |
| 41. 4-Bromophenyl phenyl ether | | | X |
| 42. Bis(2-chloroisopropyl)ether | | | X |
| 43. Bis(2-chloroethoxy)methane | | | X |
| 44. Methylene Chloride | | | X |
| 45. Methyl Chloride | | | X |
| 46. Methyl Bromide | | | X |
| 47. Bromoform | | | X |
| 48. Dichlorobromomethane | | | X |
| 49. Trichlorofluoromethane | | | X |
| 50. Dichlorodifluoromethane | | | X |
| 51. Chlorodibromomethane | | | X |
| 52. Hexachlorobutadiene | | | X |
| 53. Hexachlorocyclopentadiene | | | X |
| 54. Isophorone | | | X |
| 55. Naphthalene | | | X |
| 56. Nitrobenzene | | | X |
| 57. 2-Nitrophenol | | | X |
| 58. 4-Nitrophenol | | | X |
| 59. 2,4-Dinitrophenol | | | X |
| 60. 4,6-Dinitro-o-cresol | | | X |
| 61. N-nitrosodimethylamine | | | X |
| 62. N-nitrosodiphenylamine | | | X |
| 63. N-nitrosodi-n-propylamine | | | X |
| 64. Pentachlorophenol | | | X |
| 65. Phenol | | | X |
| 66. Bis(2-ethylhexyl)phthalate | | | X |
| 67. Butyl Benzyl Phthalate | | | X |

TABLE A - continued

| Material | (Check the appropriate column) | | |
|---|---|---|---|
| Organic Compounds - continued | Present | Not Detected | Unknown |
| 68. Di-n-butyl Phthalate | | | X |
| 69. Di-n-octyl Phthalate | | | X |
| 70. Diethyl Phthalate | | | X |
| 71. Dimethyl Phthalate | | | X |
| 72. Benzo(a)anthracene | | | X |
| 73. Benzo(a)pyrene | | | X |
| 74. 3,4-Benzofluoranthene | | | X |
| 75. Benzo(k)fluoranthane | | | X |
| 76. Chrysene | | | X |
| 77. Acenaphthylene | | | X |
| 78. Anthracene | | | X |
| 79. Benzo(ghi)perylene | | | X |
| 80. Fluorene | | | X |
| 81. Phenanthrene | | | X |
| 82. Dibenzo(a,h)anthracene | | | X |
| 83. Ideno(1,2,3-cd)pyrene | | | X |
| 84. Pyrene | | | X |
| 85. Tetrachloroethylene | | | X |
| 86. Toluene | | | X |
| 87. Trichloroethylene | | | X |
| 88. Vinyl Chloride | | | X |
| 89. Aldrin | | | X |
| 90. Dieldrin | | | X |
| 91. Chlordane | | | X |
| 92. 4,4'-DDT | | | X |
| 93. 4,4'-DDE | | | X |
| 94. 4,4'-DDD | | | X |
| 95. A-endosulfan-Alpha | | | X |
| 96. B-endosulfan-Beta | | | X |

TABLE A - continued

| Material | (Check the appropriate column) | | |
|---|---|---|---|
| Organic Compounds - continued | Present | Not Detected | Unknown |
| 97. Endosulfan Sulfate | | | X |
| 98. Endrin | | | X |
| 99. Endrin Aldehyde | | | X |
| 100. Heptachlor | | | X |
| 101. Heptachlor Epoxide | | | X |
| 102. a-BHC-Alpha | | | X |
| 103. b-BHC-Beta | | | X |
| 104. r-BHC-Gamma | | | X |
| 105. g-BHC-Delta | | | X |
| 106. PCB-1242 | | | X |
| 107. PCB-1254 | | | X |
| 108. PCB-1221 | | | X |
| 109. PCB-1232 | | | X |
| 110. PCB-1248 | | | X |
| 111. PCB-1260 | | | X |
| 112. PCB-1016 | | | X |
| 113. Toxaphene | | | X |
| 114. 2,3,7,8-Tetrachlorodibenzo-p-dioxin | | | X |

## PART III

### WASTE WATER TREATMENT TECHNOLOGY
### INORGANIC CHEMICALS CATEGORY

1. Do you have a waste water treatment facility(ies) at this plant?

__X__Yes __ __No

If yes, fill out appropriate items applicable to existing waste water treatment facility.

(a) 1) Separate waste water treatment from product Center 0563 Copper Products operates __24__ hrs/day __365__ days/year.

2) Separate waste water treatment from product Center 0565 Alumina Products operates __24__ hrs/day __365__ days/year.

3) Separate waste water treatment from product Center 0564 Zirconium Products operates __24__ hrs/day __365__ days/year.

Note: See continuation on attached data

(b) Waste water treatment is a combined treatment from Products (i) __Nickel__ (ii) __Catalyst__ (iii) __Copper__ (iv) __Miscl.__

2. For existing waste treatment check Unit Treatment Processes existing and attach sketch showing general arrangement for each system.

A. 1) For separate treatment of wastes from single Product Center 0563 Copper Products;

Influent Pumping..X..Equalization....Aeration....Chemical Addition..X.. Sedimentation....Filtration..X..Carbon Adsorption.....Chlorination.... pH Adjustment..X..Flow Measurement.....Auto. Sampling....pH Instrument. Unlined Impoundment....Lined Impoundment....Effluent Pumping..X..Sludge Pumping..X..Sludge Dewatering..X..Other_____

Design Capacity of above system 16,000 gal/day

Note: See continuation on attached data

B. Combined treatment of wastes from Products (i) __Nickel__ (ii) __Catalyst__ (iii) __Copper__ (iv) __Miscl.__ (South Pollution Control, Center 0561

Influent Pumping..X..Equalization..X..Aeration....Chemical Addition..X.. Sedimentation....Filtration...X..Carbon Adsorption.....Chlorination.... pH Adjustment..X..Flow Measurement..X..Auto. Sampling..X..pH Instrument. Unlined Impoundment....Lined Impoundment....Effluent Pumping..X Sludge Pumping..X..Sludge Dewatering..X..Other_____

Design Capacity of above system 624,000 gal/day

3. **Total Energy Requirements for Waste Treatment:**

A. Operating HP for single product waste treatment system(s):

| | | | | | |
|---|---|---|---|---|---|
| (Center 0563) | **For product** | Copper Products | **is** | nil | **HP** hr.per day |
| (Center 0565) | | Alumina Products | **is** | nil | **HP** hr.per day |
| (Center 0564) | | Zirconium Products | **is** | nil | **HP** hr.per day |
| (Center 0562) | | Ceramic Products | **is** | 375 | **HP** hr.per day |

(Center 0561) B. Operating HP for combined waste treatment from products identified in Item 2.B above is 220 HP. hr. per day

4. Do you consider your waste water treatment plant as a typical plant for the industry? Yes

5. Cost

| | Separate Treatment Year | Separate Treatment Cost 1980 Dollars (Total Centers 0562-0565) | Combined Treatment Year | Combined Treatment Cost 1980 Dollars (Center 0561) |
|---|---|---|---|---|
| a. Original installation (Battery limits only, do not include cost of land, collecting sewers, in-plant piping, pumping stations, etc.) | 1976 1977 | $381,100 | 1976-1977 | $372,200 |
| Land Area (Acres) | | 0.22 | | 0.12 |
| b. Estimated replacement cost of items in "a" | | $580,700 | | $567,100 |
| c. Estimated capital expenditure for this facility to date | | $200 | | $7,900 |
| d. Annual cost of operation & maintenance (exclude depreciation & debt service) | | $153,400 | | $184,200 |

6. List major modifications or additions since original installation and state the purpose of the modification or addition.

| Modification-Addition | Facility | Year | Cost 1980 $ | Purpose of Modification |
|---|---|---|---|---|
| -- | -- | -- | -- | -- |
| | | | | |
| | | | | |
| | | | | |

7. List planned modification or addition and estimated date of completion and state the purpose of the modification or addition.

| Modification-Addition | Treatment Facility | Year | Cost 1980 $ | Purpose of Modification |
|---|---|---|---|---|
| -- | -- | -- | -- | -- |
| | | | | |
| | | | | |
| | | | | |

8. Have treatability studies employing other treatment processes such as carbon sorption technology, filtration, biological treatment, sedimentation, neutralization, hydrolysis, precipitation, oxidation/reduction, ion exchange, phenol recovery, etc., been run on any of the process waste water streams from the plant?

X Yes __No

If yes, list those product/process streams from which treatability studies were conducted.

Copper Products

9. Please indicate any comments that you have that might be beneficial to the conduct of this study to develop effluent quidelines and standards of performance for the manufacture of inorganic chemicals.

ADDITIONAL DATA

Continuation of Part III, 1., (a), page 1

4) Separate waste water treatment from product Center 0562, Ceramic Products operates 24 hrs/day 365 days/year.

Continuation of Part III, 2. A., page 1

2) For separate treatment of wastes from single Product Center 0565, Alumina Products;

Influent Pumping.X..Equalization....Aeration....Chemical Addition..X.Sedimentation....Filtration.....Carbon Adsorption....Chlorination....pH Adjustment.X.Flow Measurement....Auto. Sampling..X.pH Instrument. Unlined Impoundment....Lined Impoundment....Effluent Pumping.X.. Sludge Pumping....Sludge Dewatering....Other _____

Design Capacity of above system 316,648 gal./day

3) For separate treatment of wastes from single Product Center 0564, Zirconium Products;

Influent Pumping.X..Equalization.X..Aeration....Chemical Addition.X..Sedimentation....Filtration....Carbon Adsorption....Chlorination....pH Adjustment.X.Flow Measurement....Auto. Sampling..X.pH Instrument. Unlined Impoundment....Lined Impoundment....Effluent Pumping..X. Sludge Pumping....Sludge Dewatering....Other _____

Design Capacity of above system 316,648 gal./day

4) For separate treatment of wastes from single Product Center 0562, Ceramic Products;

Influent Pumping..X.Equalization....Aeration....Chemical Addition....Sedimentation....Filtration.X.Carbon Adsorption....Chlorination....pH Adjustment...Flow Measurement....Auto. Sampling...pH Instrument. Unlined Impoundment....Lined Impoundment....Effluent Pumping..X. Sludge Pumping....Sludge Dewatering....Other _____

Design Capacity of above system 43,200 gal./day

ADDITIONAL DATA

Refer to Part II, 2., and 3.

See attached analytical reports

The following samples are weekly samples taken of the waste stream just prior to leaving the plant at sample point #1. Three (3) grab samples are taken over an 8 hour period and composited together. The flow readings given for these samples are gal per day. The flow readings are measured using a Badger Model ML-MN flow meter.

#E307-12-7-

| | | | |
|---|---|---|---|
| -611 | -660 | -720 | -769 |
| -613 | -662 | -722 | -770 |
| -614 | -664 | -724 | -772 |
| -616 | -665 | -725 | -776 |
| -618 | -667 | -727 | -778 |
| -620 | -669 | -729 | -780 |
| -621 | -671 | -731 | -781 |
| -623 | -672 | -732 | -786 |
| -625 | -674 | -734 | -788 |
| -627 | -676 | -736 | -790 |
| -629 | -678 | -738 | -792 |
| -631 | -680 | -739 | -794 |
| -632 | -682 | -741 | -795 |
| -634 | -683 | -743 | -797 |
| -636 | -685 | -745 | -799 |
| -638 | -687 | -747 | -801 |
| -640 | -700 | -749 | -803 |
| -642 | -702 | -751 | |
| -643 | -703 | -752 | |
| -645 | -705 | -754 | |
| -647 | -707 | -756 | |
| -649 | 709 | -758 | |
| -651 | -711 | -760 | |
| -652 | -712 | -761 | |
| -654 | -714 | -763 | |
| -656 | -716 | -765 | |
| -658 | -718 | -767 | |

ADDITIONAL DATA

Refer to Part II, 2., and 3.

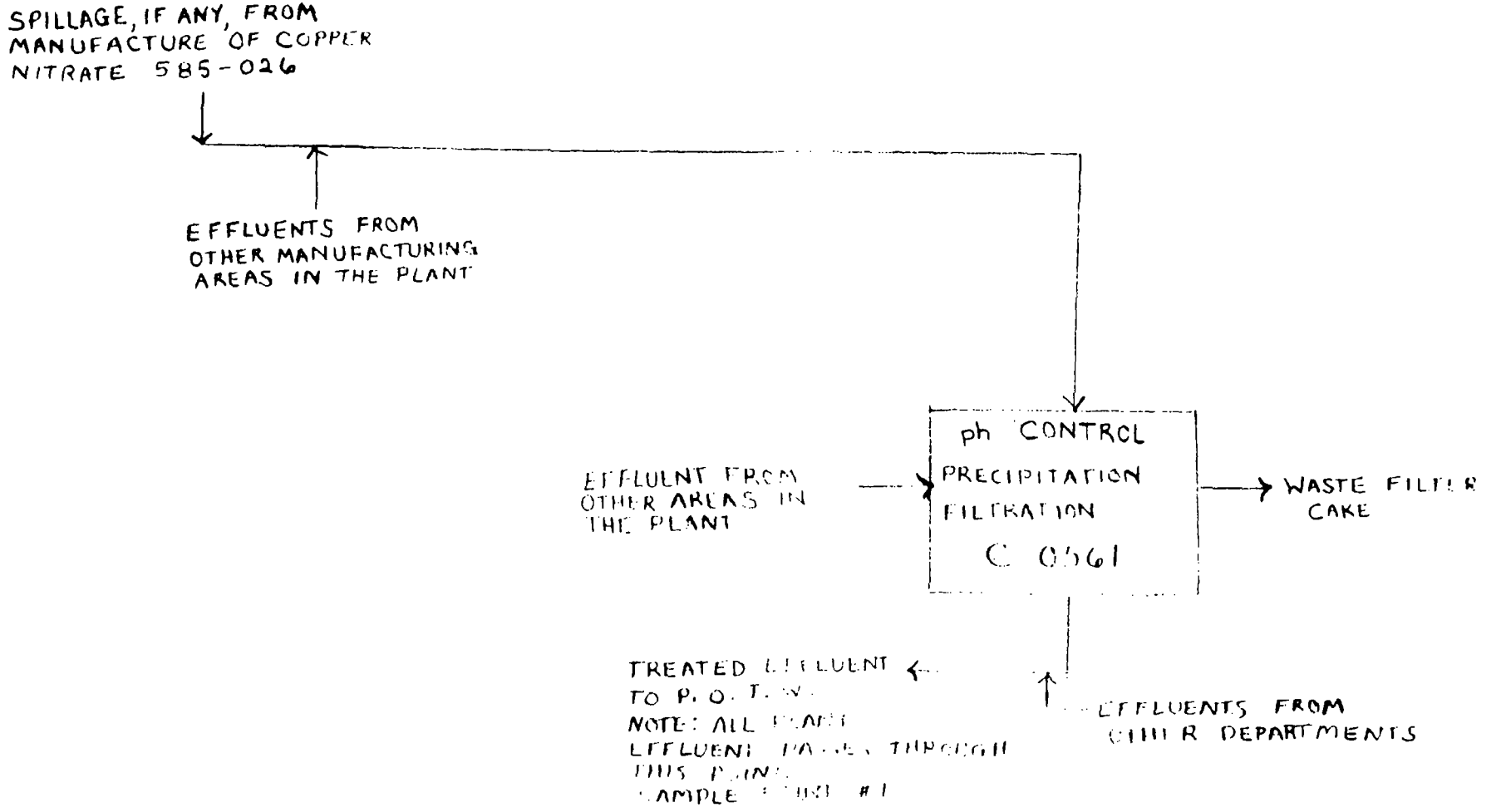
The following samples are a seven day composite of 1 hour grab samples. Samples were collected using a Serco automatic sampler from the waste stream just before it leaves the plant at sample point #1.

The flow readings given for these samples are gals. per week. The flow readings are measured using a Badger Model ML-MN flow meter.

#E307-12-7-

| | | |
|---|---|---|
| -610 | -673 | -746 |
| -612 | -675 | -748 |
| -615 | -677 | -750 |
| -617 | -679 | -753 |
| -619 | -681 | -755 |
| -622 | -684 | -757 |
| -624 | -686 | -759 |
| -626 | -688 | -762 |
| -628 | -701 | -764 |
| -630 | -704 | -766 |
| -633 | -706 | -768 |
| -635 | -708 | -771 |
| -637 | -710 | -773 |
| -639 | -713 | -777 |
| -641 | -715 | -779 |
| -644 | -717 | -782 |
| -646 | -719 | -787 |
| -648 | -721 | -789 |
| -650 | -723 | -791 |
| -653 | -726 | -793 |
| -655 | -728 | -796 |
| -657 | -730 | -798 |
| -659 | -733 | -800 |
| -661 | -735 | -802 |
| -663 | -737 | |
| -666 | -740 | |
| -668 | -742 | |
| -670 | -744 | |

# FLOW DIAGRAM FOR SAMPLING RE: PART II, 2. FOR NICKEL NITRATE 585-026

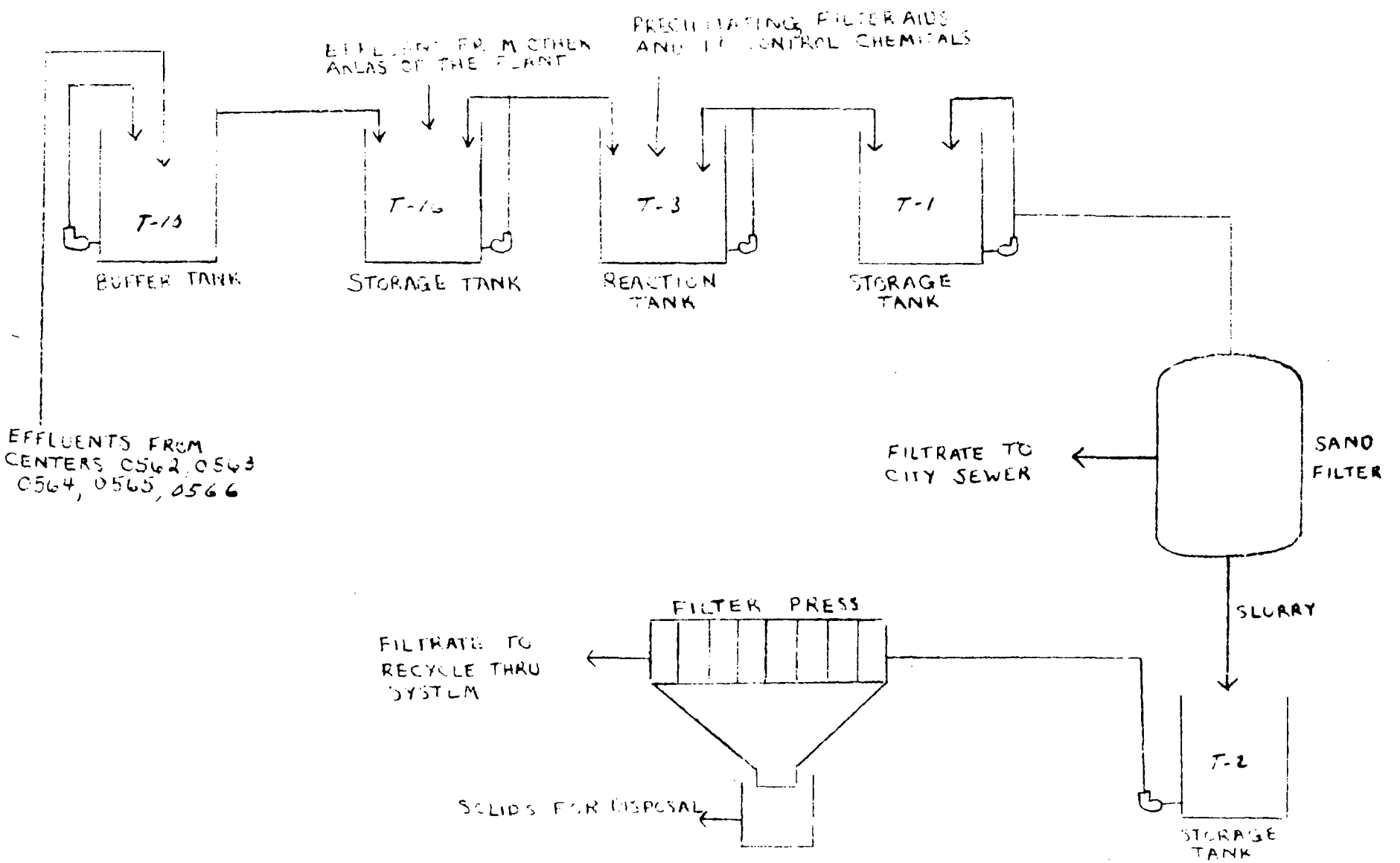



PROC. ENG. LAB. | SKETCH NO.

THE HARSHAW CHEMICAL COMPANY

CENTER 0561 (SOUTH POLLUTION CONTROL) WATER POLLUTION CONTROL FOR COMBINED AREAS

REFER TO PART III 2

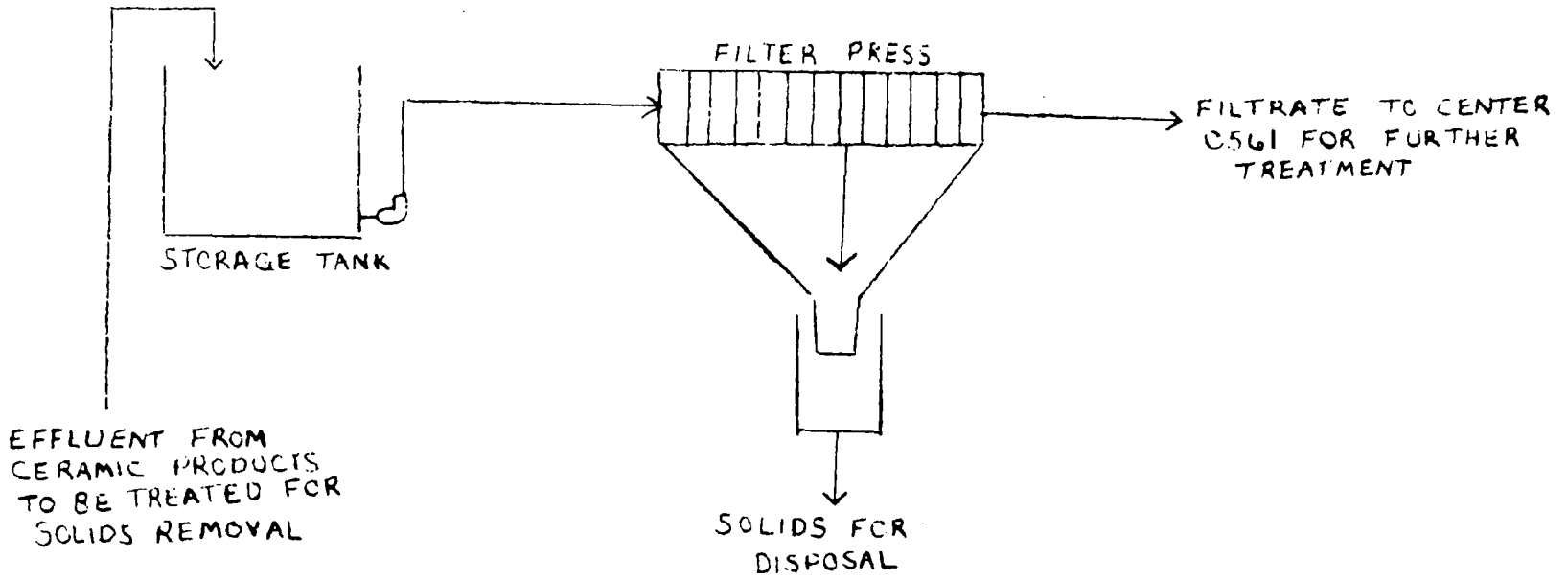



THE HAPCO-LAW CHEMICAL COMPANY

PROC. ENG. LAB.

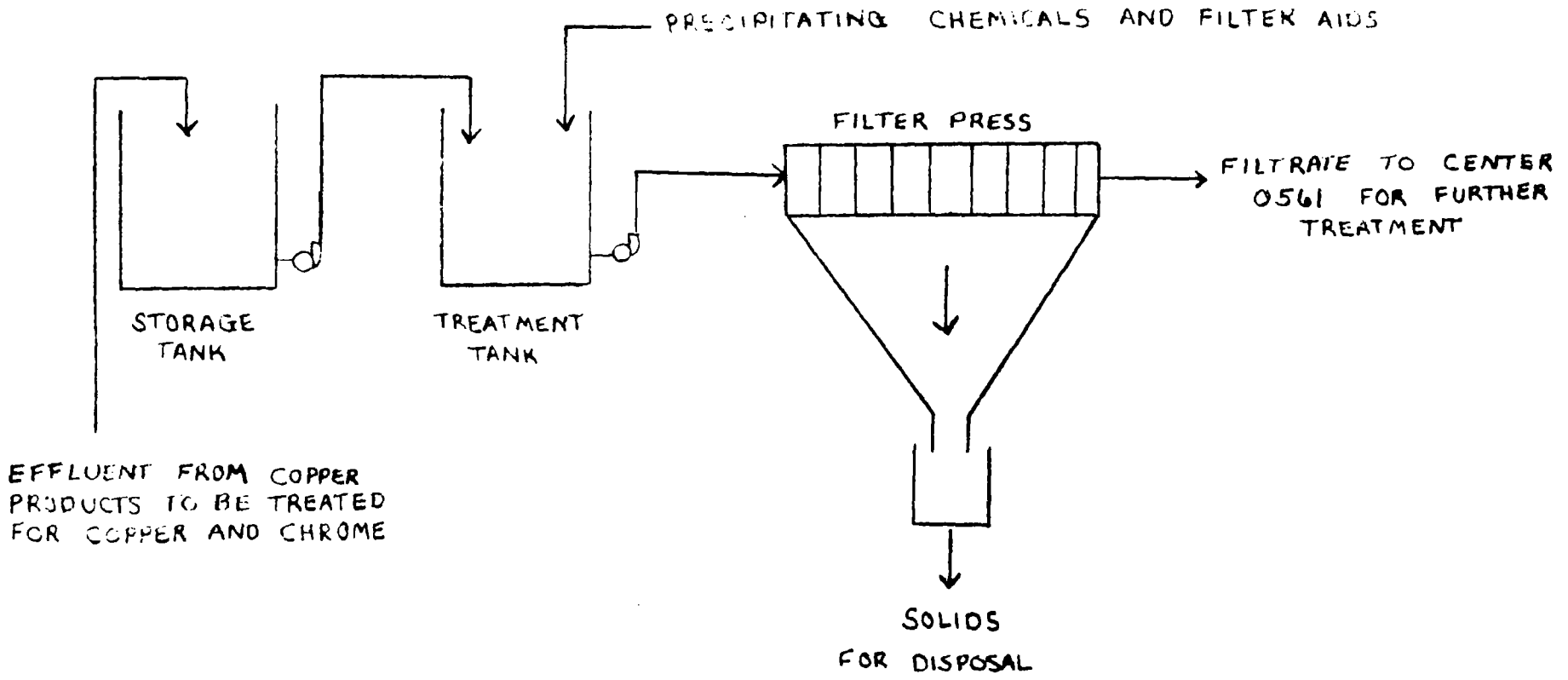
SKETCH NO.

CENTER 0562, WATER POLLUTION CONTROL FOR CERAMIC PRODUCTS
REFER TO PART III, 2



# CENTER 0563, WATER POLLUTION CONTROL FOR COPPER PRODUCTS

REFER TO PART III, 2




PROJECT ENG. LAB. SKETCH NO.

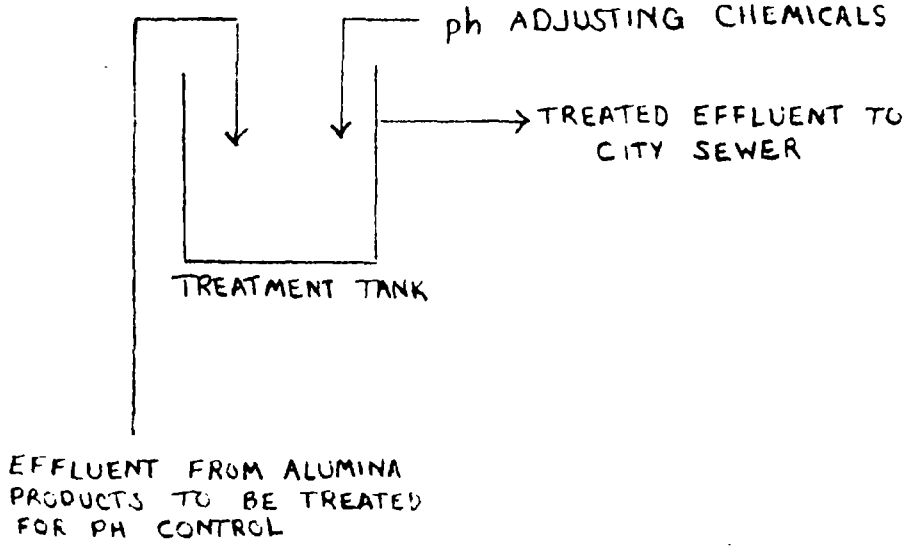
THE HARSHAW CHEMICAL COMPANY

PROC. ENG. LAB.

SKETCH NO.

# CENTER 0564, WATER POLLUTION CONTROL FOR ZIRCONIUM PRODUCTS

REFER TO PART III, 2

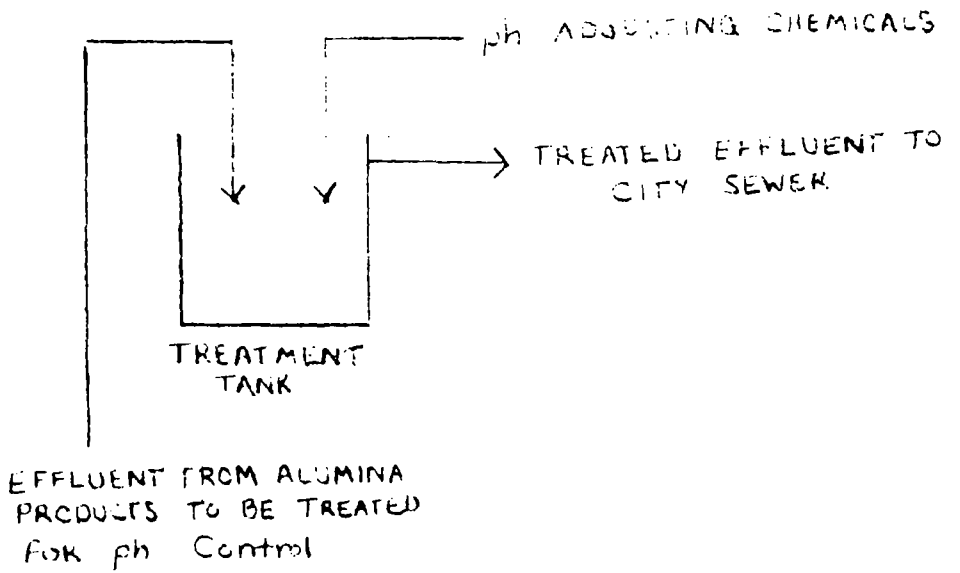


THE HARSHAW CHEMICAL COMPANY

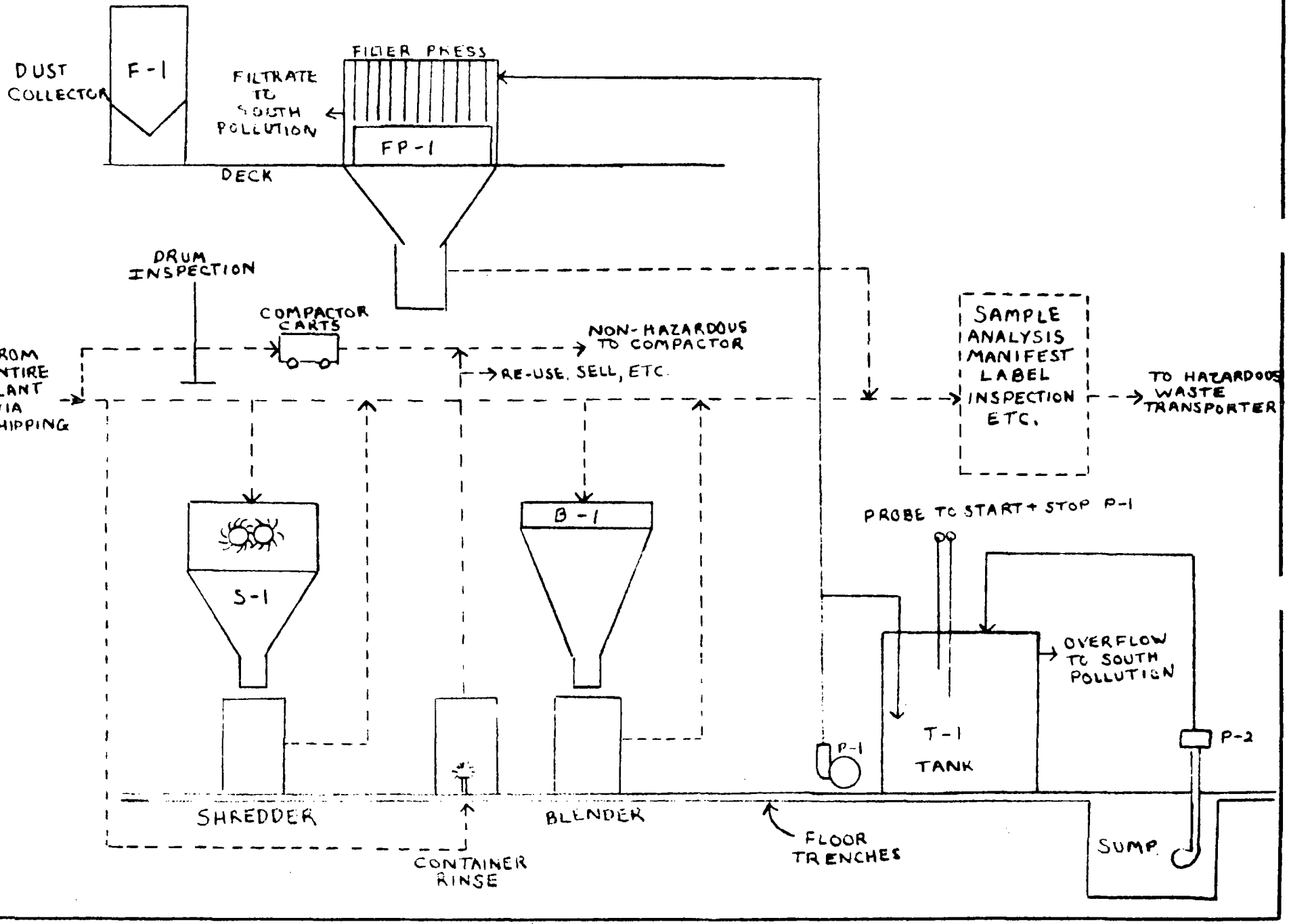
PROC. ENG. LAB.

SKETCH NO

CENTER 0565. WATER POLLUTION CONTROL FOR ALUMINA PRODUCTS
REFER TO PART III. 2



CENTER 0566, SOLID WASTE MANAGEMENT
REFER TO PART III, 2




PROC ENG. LAB. SKETCH NO.

A Newhance Industry

Refer To Part II, 2

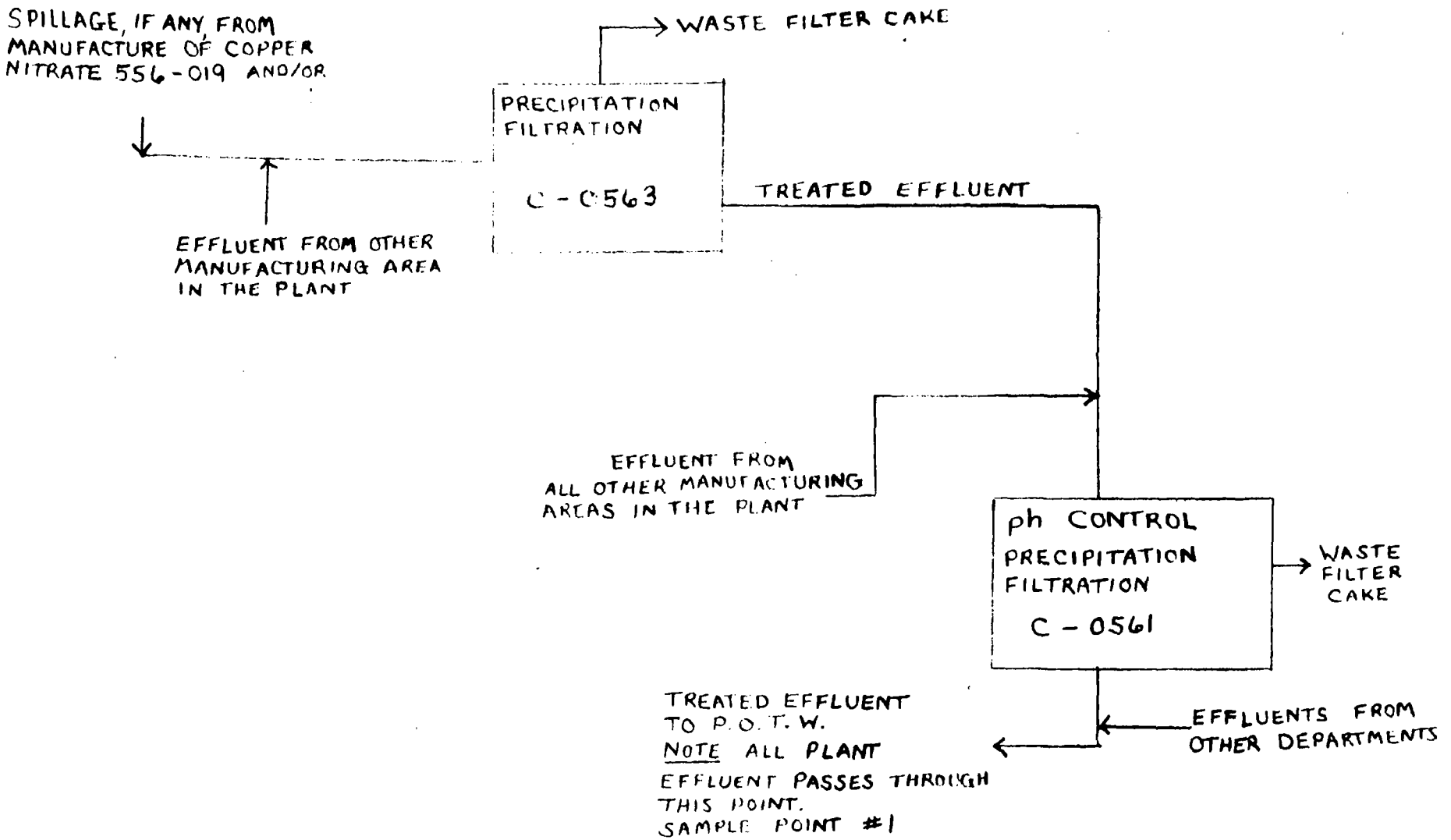
rt To RCook, FGraber, ALongano, WWoodson, KMorris, EHooker | Submitted By | Sheet No. 20

ple Of SEWER WATER EFFLUENT | Marked | From | Sample No.

| of Elyria ifications | Date | 12-21-78 | 1-3-79 | 1-3-79 | 1-4-79 | 1-10-79 | 1-10-79 | 1-18-79 | 1-18-79 | 1-25-79 | 1-24-[illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| g/liter | Sample #E307-12-7- | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 |
| OW READING | GAL X $10^{-3}$ | 2843 | 476 | 3205 | 511 | 520 | 3391 | 646 | 3815 | 515 | 3516 |
| 8000 | Dissolved Solids | X | 5643 | X | | 3223 | X | 6161 | X | 4977 | X |
| 800 preferred | Suspended Solids | (943) | 607 | 479 | | 475 | 523 | 450 | 265 | 321 | 293 |
| | Total Al | 363 | X | 40 | | X | 59 | X | 52 | | [illegible] |
| 2 | Copper | | .4 | | | .5 | | (3.0) | | 1.6 | |
| 0.2 | Lead | | .2 | | | .1 | | .1 | | .2 | |
| 2 | Nickel | | .4 | | | .7 | | 2.0 | | 1.8 | |
| 0.15 | Cadmium | | <.1 | | | X | | .05 | | .06 | |
| | Ammonia - N | | 6.65 | | | 850 | | | | | |
| 5 | Zinc | | .1 | | | .7 | | | | | |
| 2 | Chromium (total) | | <.1 | | | | | | | | |
| 1 | Cobalt | | .1 | | | | | | | | |
| 5 | Barium | | .1 | | | | | | | | |
| 3 | Aluminum (soluble) | | .7 | | | | | | | | |
| 15 | Iron | | 1.8 | | | | | | | | |
| 1 | Molybdenum | | .2 | | | | | | | | |
| 20 | Fluoride | | 1.7 | | | | | | | | |
| 0.001 | Mercury | | <.001 | | | | | | | | |
| 5 | Phosphates - P | | 1.4 | | | | | | | | |
| 0.25 | Arsenic | | <.1 | | | | | | | | |
| 00 | COD | | 22 | | | | | | | | |
| 50 | Oil & Grease | | | | 5.4 | | | | | | |
| | | | | | | | | | | | |

oval K. BOECKER | Analyst

# FLOW DIAGRAM FOR SAMLING RE: PART II, 2. FOR NICKEL NITRATE 556 - 019




SKETCH NO.

PROC. ENG. LAB.

THE HARSHAW CHEMICAL COMPANY

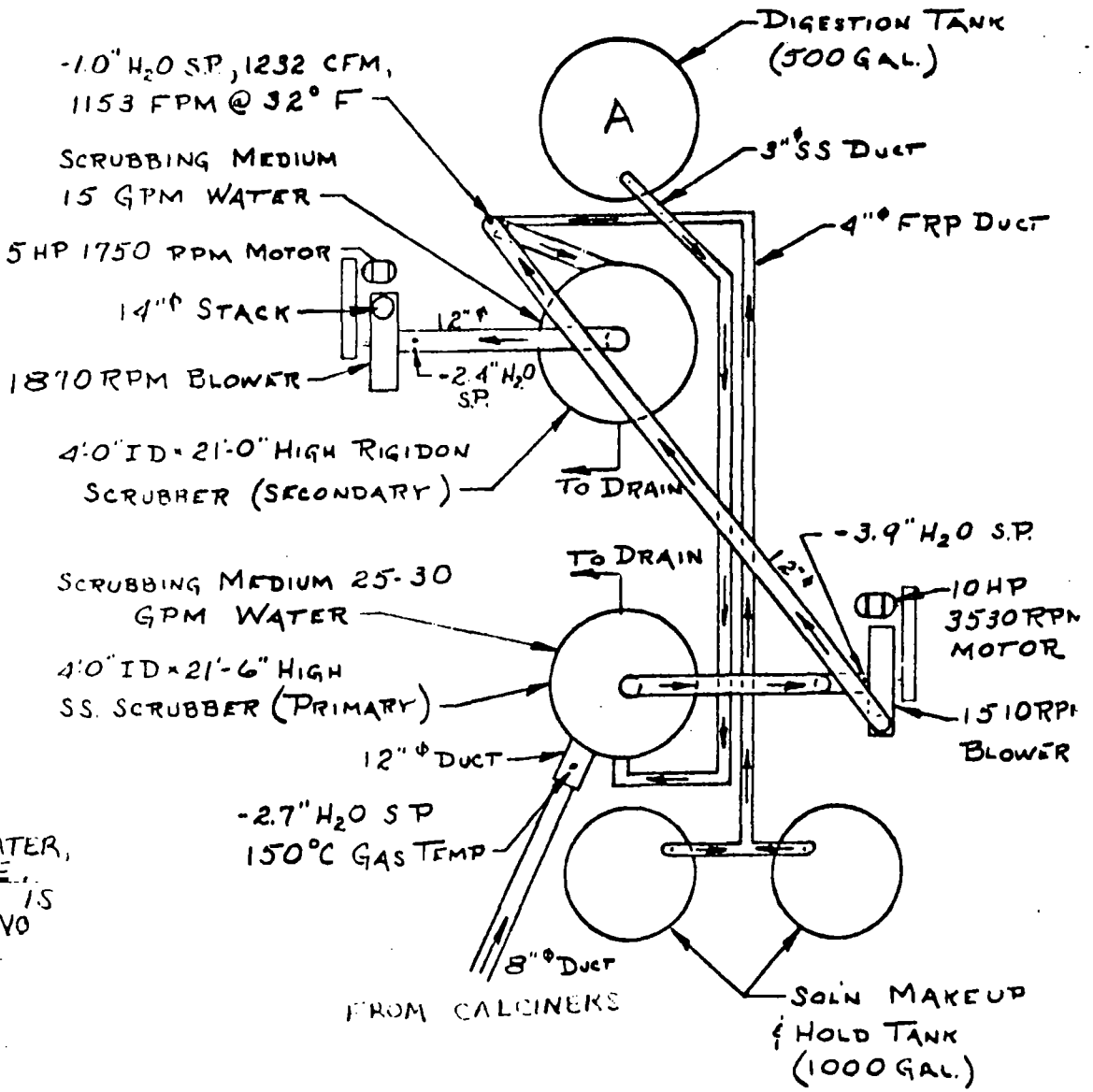
# PROCESS FLOW DIAGRAM FOR PART I,7., HARSHAW CODE 585-026

THE HARSHAW CHEMICAL COMPANY
CIV. OF KEWANEE OIL CO.
113 JOHN STREET
ELYRIA, OHIO

WEST OUTSIDE WALL

BLDG. C-1

ALL STAINLESS OR FRP DUCTWORK (STAINLESS UP TO PRIMARY SCRUBBER & FRP FROM THAT POINT ON THRU STACK)

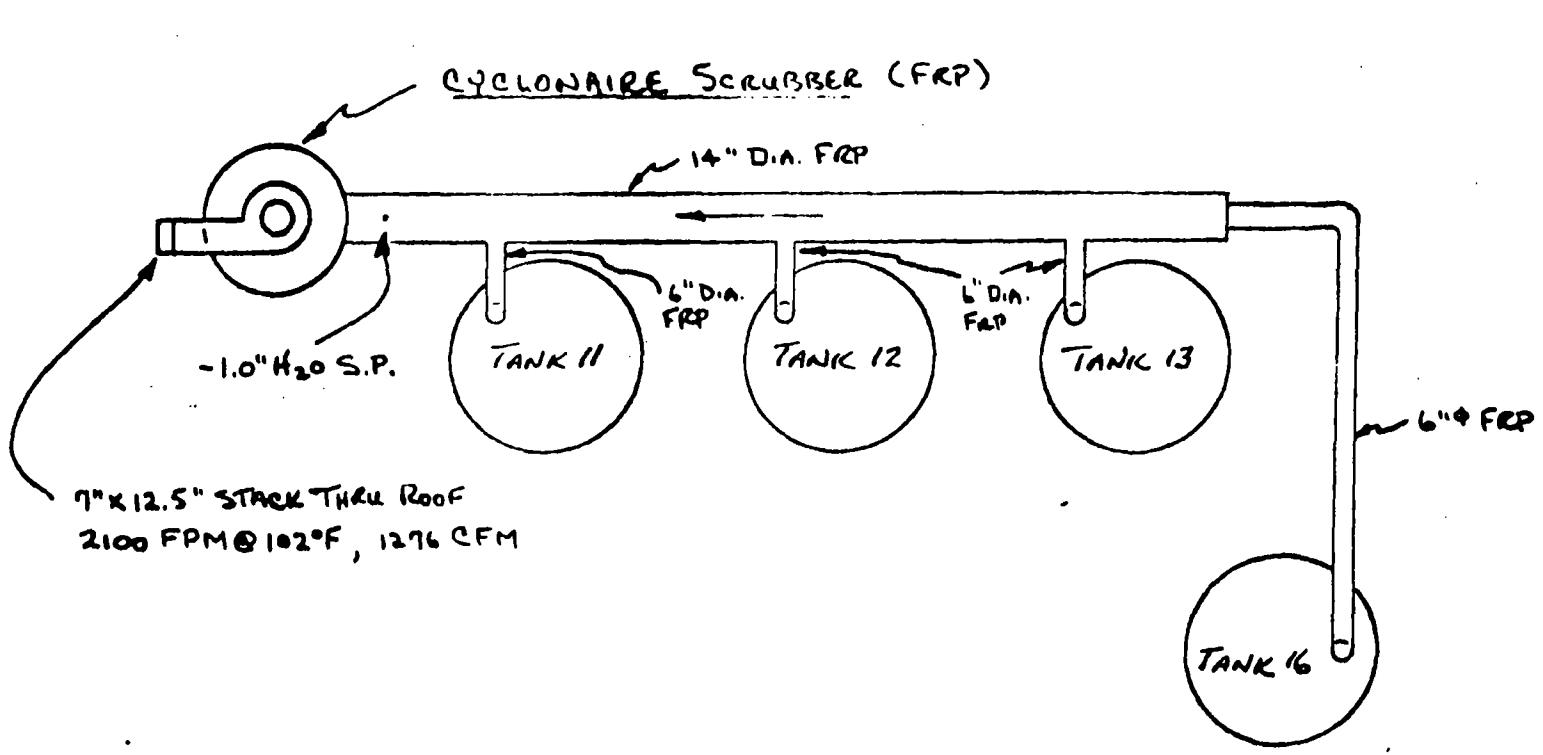



PROCESS

TANK A IS CHARGED WITH WATER, NITRIC ACID AND COPPER OXIDE. THE RESULTING COPPER NITRATE IS PUMPED TO A STORAGE TANK. NO WASTE OUTFLOWS OCCUR

THE HARSHAW CHEMICAL COMPANY

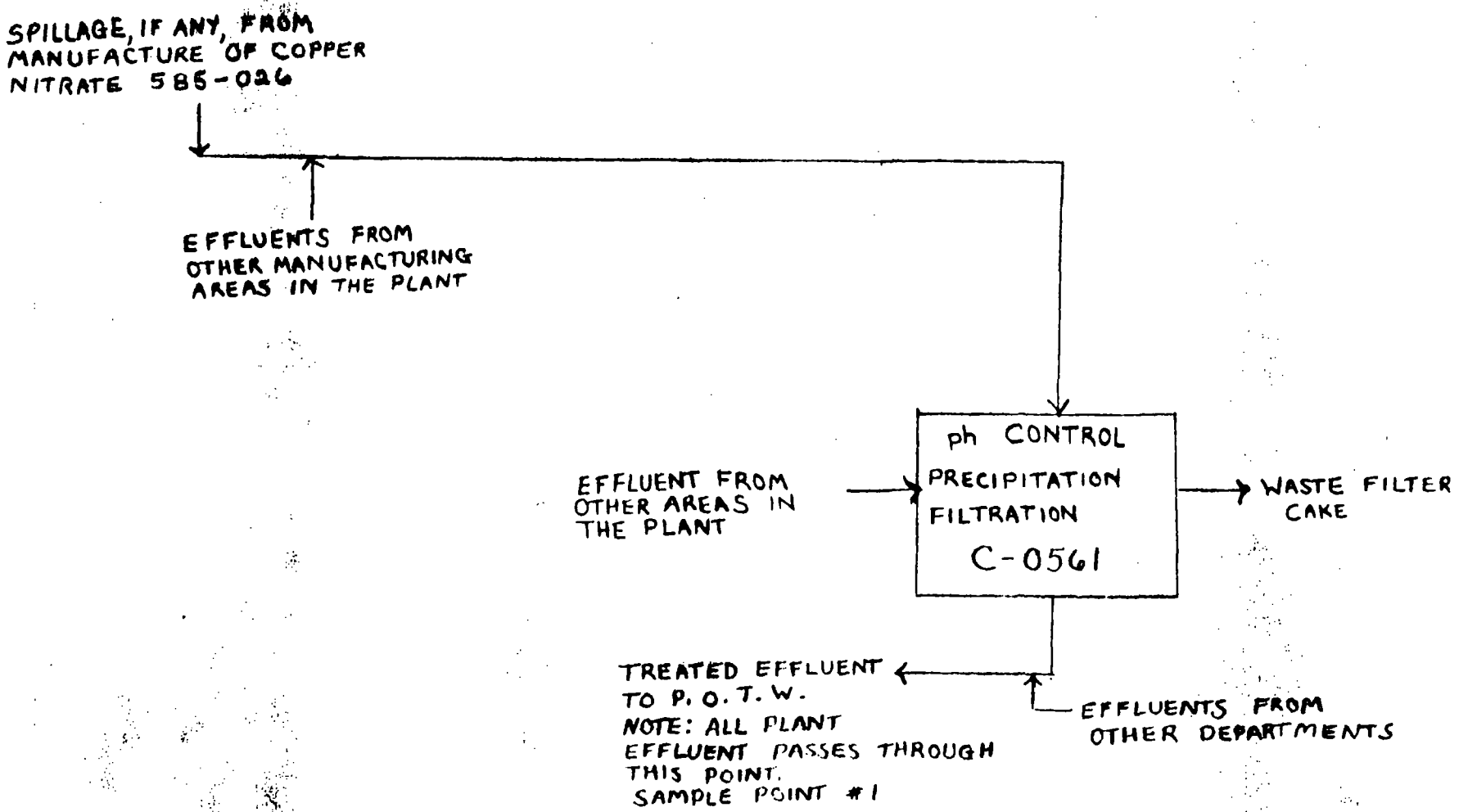
# PROCESS FLOW DIAGRAM FOR PART I, 7., HARSHAW CODE 556 - 019




PROCESS

TANK 13 IS CHARGED WITH WATER, NITRIC ACID AND COPPER OXIDE. THE RESULTING COPPER NITRATE IS PUMPED TO A STORAGE TANK. NO WASTE OUTFLOWS OCCUR

# FLOW DIAGRAM FOR SAMPLING RE: PART II, 2. FOR NICKEL NITRATE 585-026

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PROC. ENG. LAB.

SKETCH NO.